

Supporting Mathematics in the New Zealand Curriculum

Numicon 1 and Level 1

Numicon is a proven approach to teaching and learning designed to give children the *understanding of mathematical ideas and relationships* that is essential for successful reasoning and problem-solving.

The use of **apparatus** builds children's mental image of abstract concepts, and helps to develop their understanding of the connections between different areas of mathematics.

The **resources** cover the key mathematical ideas for number, geometry and measurement that are essential foundations for further mathematical thinking.

Focus activities and milestones have been correlated to Level One of the NZ Curriculum to support teachers in their planning. These correlations will be useful:

- following the order outlined in the Teaching Resource Handbook
- to dip in and out of the teaching materials for different topics.

The full text for the milestone references appears underneath the chart.

'Securing Foundations' (SF) refers to the first 12 activity groups of Number, Pattern and Calculating 1. These activity groups feature a combination of activities from the three strands: Pattern and Algebra, Numbers and the Number System, and Calculating.

Note that statistics is covered in Geometry and Measurement strands.

In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations that require them to:	Numicon focus activity reference					
	Number, Pattern and Calculating 1 Teaching Resource Handbook			Geometry, Measurement and Statistics 1 Teaching Resource Handbook		Milestone reference
	Pattern and Algebra	Numbers and the Number System	Calculating	Geometry	Measurement	
NUMBER – NUMBER AND PLACE VALUE						
NA1-2 Know the forward and backward counting sequences of whole numbers to 100	–	3.1 • 3.2 • 3.3 • 3.4 • 3.5 • 3.6 • 3.7 • 3.8 • 4.6 Securing Foundations SF1.1 • SF1.2 • SF1.3 • SF2.1 • SF11.1	–	–	–	NPC 1:6b, NPC 1:7c, NPC 1:7d NPC 1: 1a, NPC 1: 1b NPC 1: 1f, NPC 1: 1g NPC 1:3c
NA1-1 Use a range of counting, grouping, and equal sharing strategies with whole numbers Count, read and write numbers to 100 in numerals, count in multiples of twos, fives and tens	–	1.5 • 2.1 • 2.2 • 3.2 • 3.3 • 3.4 • 3.5 • 3.7 • 3.8	–	–	–	NPC 1:4g, NPC 1:5a, NPC 1:5b, NPC 1:5c, NPC 1:5d, NPC 1:6b
NA1-5: Generalise that the next counting number gives the result of adding one object to a set and that counting the number of objects in a set tells how many. Given a number, identify one more and one less	–	SF5.1 • SF5.2	2.1 • 2.2 • 2.3 • 2.4 • 2.5 • 2.6 • 2.7 • 3.1	–	–	NPC 1: 1d NPC 1:4d, NPC 1:4e, NPC 1:4g, NPC 1:4h
NA1-1 Use a range of counting, grouping, and equal sharing strategies with whole numbers Identify and represent numbers using	1.1 • 1.2 • 1.3 • 1.4 • 1.5 • 1.6 • 1.8	2.1 • 2.2 • 3.1 • 3.2 • 3.3 • 3.4 • 3.5 • 3.6 • 4.3 • 4.5	2.1 • 2.6 • 3.6 • 6.1 • 6.2 • 8.6 •	–	–	NPC 1:4a, NPC 1:4b, NPC 1:4e, NPC 1:4f, NPC 1:4h, NPC 1:5a, NPC 1:5b, NPC 1:5c, NPC 1:5d, NPC 1:6b, NPC 1:6e, NPC 1:6f, NPC 1:7c, NPC 1:7d, NPC 1:7e, NPC 1:7f, NPC 1:8c, NPC 1:8d,

objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least			9.4			NPC 1:8e NPC 1:8f, NPC 1:8g
Read and write numbers from 1 to 20 in numerals and words.	–	1.1 • 1.2 • 1.3 • 1.4 • 1.5 • 2.1 • 2.2 • SF3.4 • SF5.2 • SF6.2 • SF6.3	–	–	–	NPC 1:4f, NPC 1:5a, NPC 1:5b, NPC 1:5c, NPC 1:5d NPC 1: 1d NPC 1: 1e, NPC 1: 1f NPC 1: 2a

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	Number, Pattern and Calculating 1 Teaching Resource Handbook			Geometry, Measurement and Statistics 1 Teaching Resource Handbook		
	Pattern and Algebra	Numbers and the Number System	Calculating	Geometry	Measurement	
NUMBER – ADDITION AND SUBTRACTION						
NA1-4: Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures.	1.8	–	1.4 • 1.5 • 2.2 • 3.2 • 3.4 • 4.1 • 4.2 • 4.3 • 4.4 • 7.5 • 8.1 • 8.2 • 8.10 • 8.12 SF12.2 • SF12.3	–	–	NPC 1:3d, NPC 1:4a, NPC 1:4b, NPC 1:4c, NPC 1:4d, NPC 1:4e, NPC 1:4h, NPC 1:5e, NPC 1:6c, NPC 1:7e, NPC 1:7f, NPC 1:8c, NPC 1:8f, NPC 1:8g
NA1-3: Know groupings with five, ten and with ten	–	–	8.5 • 8.9 • 8.10 • 8.11 • 8.12 • 8.13 • 9.5	–	–	NPC 1:6d, NPC 1:6e, NPC 1:7e, NPC 1:7f, NPC 1:8c, NPC 1:8d, NPC 1:8e, NPC 1:8f, NPC 1:8g
NA1-4: Communicate and explain counting, grouping, and equal-sharing	–	–	1.4 • 1.6 • 2.1 • 2.3 • 2.5 •	–	–	NPC 1:4f, NPC 1:5e, NPC 1:7e, NPC 1:7f, NPC 1:8c, NPC 1:8f, NPC 1:8g

<p>strategies, using words, numbers, and pictures. Add and subtract one-digit and two-digit numbers to 20, including zero</p>			<p>2.7 • 4.19 • 4.20 • 8.5 • 8.7 • 8.8 • 8.9 • 8.10 • 8.11 • 8.12 • 8.13</p>			
<p>NA1-4: Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \square - 9$.</p>	–	–	<p>1.1 • 3.1 • 4.7 • 4.14 • 4.15 • 4.19 • 4.20 • 4.22 • 7.5 • 8.2</p>	–	–	<p>NPC 1:4c, NPC 1:4d, NPC 1:4g, NPC 1:5e, NPC 1:6c, NPC 1:7e, NPC 1:7f, NPC 1:8c, NPC 1:8f, NPC 1:8g</p>

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	Pattern and Algebra	Numbers and the Number System	Calculating	Geometry	Measurement	
NUMBER – MULTIPLICATION AND DIVISION						
<p>NA1-1 Use a range of counting, grouping, and equal sharing strategies</p>	–	–	<p>5.2 • 5.3 • 5.4 • 5.5</p>	–	–	<p>NPC 1:5f, NPC 1:5g</p>
NUMBER – FRACTIONS						
<p>NA1-1 Use a range of counting, grouping, and equal sharing strategies with fractions</p>	–	–	<p>5.1 • 5.2 • 5.3 • 5.4 • 5.5</p>	–	6.4	<p>NPC 1:5f, NPC 1:5g, GMS 1:3d, GMS 1:3e, GMS 1:3f</p>
<p>NA1-1 Use a range of counting, grouping, and equal sharing strategies with fractions</p>	–	–	<p>5.1 • 5.2 • 5.3 • 5.4</p>	–	6.4	<p>NPC 1:5f, NPC 1:5g, GMS 1:3d, GMS 1:3e, GMS 1:3f</p>

MEASUREMENT						
<p>GM1-1: Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units.</p>	1.1 1.4	–	1.1 • 1.3 • 2.1 • 2.5	–	1.1 • 1.2 • 1.3 4.1 • 4.2 • 4.3 • 4.4 5.1 • 5.2 • 5.3 • 5.4 3.1 • 3.2 • 3.3 • 6.1 • 6.2 • 6.3 • 6.4	NPC 1:4a, NPC 1:4b, NPC 1:4c, NPC 1:4e, NPC 1:4h, GMS 1: 1e, GMS 1: 1f, GMS 1:1i, GMS 1:1j, GMS 1:1k, GMS 1:2c, GMS 1:2d, GMS 1:2e, GMS 1:2f, GMS 1:2g, GMS 1:2h, GMS 1:3d, GMS 1:3e, GMS 1:3f
<p>GM1-1: Measure objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. Measure and begin to record the following:</p> <ul style="list-style-type: none"> • lengths and heights • mass/weight • capacity and volume • time (hours, minutes, seconds) 	–	–	–	–	4.2 • 4.3 • 4.4 5.2 • 5.3 • 5.4 3.4 • 3.5 • 6.4 • 6.5	GMS 1:1i, GMS 1:1j, GMS 1:1k, GMS 1:2c, GMS 1:2d, GMS 1:2e, GMS 1:2f, GMS 1:2g, GMS 1:2h, GMS 1:3d, GMS 1:3e, GMS 1:3f
Recognise and know the value of different denominations of coins and notes	–	–	3.1 • 3.2 • 3.3 • 3.4 • 3.5	–	2.2 • 2.3 • 2.4 • 2.5	NPC 1:4d, NPC 1:4g, GMS 1:1g, GMS 1:1h

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	Pattern and Algebra	Numbers and the Number	Calculating	Geometry	Measurement	

		System				
MEASUREMENT continued						
GM1-1: Order events by time by direct comparison and/or counting whole numbers of units. Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	–	–	–	–	3.1 • 3.2 • 3.3 • 6.1 • 6.2 • 6.3 • 6.4	GMS1:1i, GMS1:1j, GMS1:1k, GMS1:3d, GMS 1:3e, GMS 1:3f
GM1-1: Recognise and use language relating to dates, including days of the week, weeks, months and years	–	–	–	–	3.2 • 3.3	GMS1:1i, GMS1:1j, GMS1:1k
GM1-1: Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	–	–	–	–	6.5	(GMS1:3d,) GMS1:3e, GMS1:3f
GEOMETRY – PROPERTIES OF SHAPES						
GM1-2 Sort Objects by their appearance Recognise and name common 2-D and 3-D shapes, including: <ul style="list-style-type: none"> • 2-D shapes [for example, rectangles (including squares), circles and triangles] • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. 	–	–	–	1.1 • 1.2 • 1.3 • 1.4 • 1.5 • 2.1 • 2.2 • 2.3 • 2.4 • 2.5 • 2.6 3.1 • 3.2 • 3.3 • 3.4 • 3.5 • 4.1 • 4.2 • 4.3 • 4.4 • 4.5 • 4.6	–	GMS1:1a, GMS1:1b, GMS1:1c, GMS1:1d, GMS1:2a, GMS1:2b, GMS1:2i, GMS1:2j, GMS1:2k, GMS1:3a, GMS1:3b, GMS1:3c
GEOMETRY – POSITION AND DIRECTION						
GM1-3: Give and follow instructions for movement that involve distances, directions, and half or quarter turns. GM1-4: Describe their position relative to a person or object.	–	–	–	5.1 • 5.2 • 5.3 • 5.4 • 5.5 • 5.6 • 5.7 • 5.8	–	GMS1:3g, GMS1:3h, GMS1:3i

GM1-5: Communicate and record the results of translations, reflections, and rotations on plane shapes.

Numicon 2

Numicon Sequence of Milestones

NUMBER, PATTERN AND CALCULATING 1 MILESTONES	Code
Milestone 1	
By this point, children should be able to:	
• Create repeating patterns that have more than two elements using structured apparatus and other	NPC 1: 1a
• Recognize pattern in familiar sequences and predict what comes next	NPC 1: 1b
• Order Numicon Shapes, number rods and numerals 0–10	NPC 1: 1c
• Describe number relationships between Shapes	NPC 1: 1d
• Identify numerals and represent them using Numicon Shapes, Numicon Shape patterns and number	NPC 1: 1e
• Recite number names in order up to (record child’s counting range)	NPC 1: 1f
• Count at least 30 objects accurately, one by one	NPC 1: 1g
Milestone 2	
By this point, children should be able to:	
• Compile sets according to a chosen criterion; explain why an object does not fit the set	NPC 1: 2a
• Assign numbers to repeating patterns using structured apparatus and other media	NPC 1: 2b
• Read, say and build teen numbers from seeing numerals	NPC 1: 2c
• Build teen numbers using Shapes and rods and write numerals from hearing number names	NPC 1: 2d
• Add 1-digit numbers without counting using Numicon Shapes	NPC 1: 2e
• Illustrate a one-step adding problem with objects and structured apparatus and say the number	NPC 1: 2f
• Know when to add	NPC 1: 2g

Milestone 3	
By this point, children should be able to:	
• Illustrate a subtracting story with objects and structured apparatus and say the number sentence	NPC 1:3a
• Know when to subtract	NPC 1:3b
• Use number words as nouns, not just as adjectives e.g. talk about 'five', not just 'five cars', 'five	NPC 1:3c
• Build and read adding sentences with Numicon Shapes, numeral, word and symbol ('+') cards	NPC 1:3d
Milestone 4	
By this point, children should be able to:	
• Understand and use the language more than/less than/fewer than, most/least/fewest, equal to	NPC 1:4a
• Use '<' and '>' to compare objects, structured apparatus and numbers	NPC 1:4b
• Understand and use the '=' symbol in different number sentences, e.g. $10 = 3 + 7$; $7 = 10 - 3$	NPC 1:4c
• Understand the equivalence between coin values	NPC 1:4d
• Recognize patterns and explain regularities that they notice in patterns	NPC 1:4e
• Order numerals 0–20	NPC 1:4f
• Subtract without counting using Numicon Shapes	NPC 1:4g
• Build and read subtracting sentences with Numicon Shapes, numeral, word and symbol cards	NPC 1:4h
Milestone 5	
By this point, children should be able to:	
• Start to organize adding and subtracting facts systematically with structured apparatus and number	NPC 1:5a
• Explain the pattern of naming numbers, know where to find a number on a number line	NPC 1:5b
• Say 'how many?', without counting in ones, by looking at objects grouped in Numicon 10-patterns	NPC 1:5c
• Make a sensible estimate	NPC 1:5d
• Recall some adding and subtracting facts to 10, including doubles and adding and subtracting zero;	NPC 1:5e
• Begin to recognize that there is a relationship between adding and subtracting and between	NPC 1:5f
• Begin to understand that finding half means one of two equal parts of an object, shape or quantity	NPC 1:5g
Milestone 6	
By this point, children should be able to:	
• Use the terms odd and even when referring to numbers and totals; name odd and even numbers (to	NPC 1:6a
• Count in 2s, 5s and 10s supported by structured apparatus	NPC 1:6b

• Instantly recognize Numicon Shape patterns and number rods as representations of numbers	NPC 1:6c
• Fluently recall adding and subtracting facts of numbers to 10 and use these when calculating and	NPC 1:6d
• Begin to understand 'how many more?' as a way of finding an answer to a subtracting problem	NPC 1:6e
• Solve 'difference' problems in a data handling situation	NPC 1:6f
Milestone 7	
By this point, children should be able to:	
• Use attributes of objects or numbers to help solve problems	NPC 1:7a
• Organize work systematically and notice patterns	NPC 1:7b
• Read, say and build 2-digit numbers from seeing numerals	NPC 1:7c
• Use Shapes and rods to build and write 2-digit numbers from hearing number names	NPC 1:7d
• Use different strategies to add three numbers less than 10	NPC 1:7e
• Know that adding can be done in any order	NPC 1:7f
Milestone 8	
By this point, children should be able to:	
• Organize work systematically	NPC 1:8a
• Notice when something always happens and explain a general statement in their own way	NPC 1:8b
• Know that sometimes there is more than one answer to a question	NPC 1:8c
• Show understanding of the equivalence between quantity value and column value	NPC 1:8d
• Know when to partition into tens and ones to help solve a problem	NPC 1:8e
• Know when to use facts of numbers up to 10 to solve problems	NPC 1:8f
• Reason how to adjust known adding and subtracting facts for 10 to find facts for 11 and 12	NPC 1:8g

GEOMETRY, MEASUREMENT AND STATISTICS 1 MILESTONES	Code
Milestone 1	
By this point, children should be able to:	
• Identify squares, oblongs, triangles and circles in flat geometric shapes and the everyday environment	GMS 1: 1a
• Use the language of parts and properties, e.g. corners and sides, to show and describe how shapes can be grouped	GMS 1: 1b
• Understand that differences in size, position and orientation will not change the names of 2D shapes	GMS 1: 1c

Compare and order objects of different lengths by aligning them to the same starting point	GMS 1: 1d
• Choose appropriate non-standard units for measuring different lengths of up to 1 m	GMS 1: 1e
• Demonstrate and explain the need for accuracy when measuring using non-standard units	GMS 1: 1f
• Recognize 1p, 2p, 5p and 10p coins and show the relative values using Numicon shapes	GMS 1: 1g
• Make an amount of money from different combinations of coins, e.g. 12p	GMS 1: 1h
• Sequence events over the course of a day or week, in chronological order	GMS 1: 1i
• Recall names of days of the week and months of the year and begin to put them in order	GMS 1: 1j
• Consider how long activities may take, e.g. hours, minutes or seconds; and use suitable equipment to time activities in minutes or seconds	GMS 1: 1k
Milestone 2	
By this point, children should be able to:	
• Devise pictures and patterns using 2D shape equipment, including shapes that fit together with no gaps	GMS 1:2a
• Copy and build sequences to show which 2D shapes come next in a given repeating pattern	GMS 1:2b
• Investigate the comparative mass of three or more objects, ordering them using terms such as 'heavy', 'heavier', 'heaviest'	GMS 1:2c
• Find objects or give everyday examples, to show that the mass of an item is not linked to its overall size	GMS 1:2d
• Use a pan balance accurately when comparing two items, and for finding mass using non-standard units	GMS 1:2e
• Fill containers to illustrate capacity terms, e.g. 'empty', 'half full', 'nearly full'	GMS 1:2f
• Choose and use smaller containers to estimate and measure the capacity of larger containers	GMS 1:2g
• Explain the need to use a consistent unit when comparing the capacity of a variety of containers	GMS 1:2h
• Discuss differences between 2D flat and 3D solid shapes, using terms such as 'surface', 'edge', 'corner', 'curved', 'flat'	GMS 1:2i
• Find 3D shapes within everyday objects and consider the properties of these shapes when building models	GMS 1:2j
• Identify and visualize 3D shapes of different sizes and orientations	GMS 1:2k
Milestone 3	
By this point, children should be able to:	
• Name cubes and cuboids of varying sizes, understanding that cuboids can be different shapes	GMS 1:3a

• Name spheres, cylinders, cones and pyramids of varying sizes	GMS 1:3b
• Describe how 2D and 3D shapes might be grouped in different ways, according to similarities in appearance	GMS 1:3c
• Order events and times on a 24-hour timeline, using terms such as 'day', 'night', 'midnight', 'midday', 'morning', 'afternoon', 'o'clock'	GMS 1:3d
• Discuss the features of an analogue clock, explaining the movement of both hands	GMS 1:3e
• Illustrate o'clock and half past times on a geared clock or blank clock face	GMS 1:3f
• Describe their position, direction and movement using terms such as 'behind', 'next to', 'around', 'left', 'right', 'forwards'	GMS 1:3g
• Follow instructions to make full, half, quarter and three-quarter turns, both clockwise and anti-clockwise	GMS 1:3h
• Give verbal instructions to move around a space, using increasingly precise language to refine the sequence	GMS 1:3i