

Numicon teaching progression: Number, Pattern and Calculating 3 and Geometry, Measurement and Statistics 3

The Numicon teaching progression chart gives an overview of the expected coverage over the school year and the recommended order for teaching the activity groups. (Statistics work has been included within the Geometry and Measurement activity groups through appropriate contexts.)

See the long- and medium-term planning documents for Number, Pattern and Calculating 3 and Geometry, Measurement and Statistics 3 for references to assessment milestone statements; a fantastic tool for measuring children's progress.

Strand and activity group number	Activity group title
Getting Started	Getting started with Number, Pattern and Calculating 3
Calculating 1	Developing fluency with adding and subtracting facts to 10
Numbers and the Number System	Finding how many by grouping in 10s and 100s
Calculating 2	Developing fluency with adding and subtracting facts to 20
Numbers and the Number System	Exploring hundreds, tens and units with base-ten apparatus
Pattern and Algebra 1	Exploring the inverse relationship between adding and subtracting
Numbers and the Number System	Keeping count and writing numbers down
Calculating 3	Mental methods for adding single-digit numbers
Calculating 4	Mental methods for subtracting single-digit numbers
Pattern and Algebra 2	Exploring steps of constant size through sequences of multiples
Geometry 1	Investigating the parts and properties of polygons and polyhedra
Calculating 5	Revising multiplying as repeated adding
Calculating 6	Exploring multiplying through arrays
Calculating 7	Introducing dividing as 'How many ... in ...?'
Geometry 2	Identifying and comparing angles by size
Numbers and the Number System	Partitioning 2- and 3-digit numbers with and without money
Geometry 3	Sorting and classifying 2D and 3D shapes
Numbers and the Number System	Ordering and structuring numbers to 1000
Calculating 8	Adding and subtracting multiples of 10 and 100
Calculating 9	Patterns of similar adding and subtracting calculations
Pattern and Algebra 3	Reading and creating scales with different intervals

Strand and activity group number	Activity group title
Numbers and the Number System	6 Finding half way, rounding to the nearest 10 or 100
Calculating	10 Learning multiplying facts and looking for patterns
Calculating	11 Introducing the sharing structure of dividing
Pattern and Algebra	4 Extending sequences and finding differences
Calculating	12 Partitioning strategies for adding and subtracting
Measurement	1 Telling the time to the minute on the 12-hour clock
Measurement	2 Exploring units of time
Calculating	13 Using apparatus and imagery to introduce the written column method for adding
Calculating	14 Using apparatus and imagery to support subtracting and introducing the written column method
Calculating	15 Exploring ratio and scaling problems and introducing the short written methods of multiplying and dividing
Measurement	3 Measuring accurately and calculating with metres, centimetres and millimetres
Measurement	4 Calculating with pounds and pence, and handling money
Calculating	16 Making connections between dividing into equal parts and calculating with fractions
Measurement	5 Measuring and calculating with grams and kilograms
Measurement	6 Measuring and calculating with litres and millilitres
Numbers and the Number System	7 Understanding fractions of a whole and fractions as numbers
Numbers and the Number System	8 Using fraction notation to describe parts of a discrete set
Pattern and Algebra	5 Finding all possibilities and investigating a general statement
Geometry	4 Using grids and grid references

Getting Started: Getting started with Number, Pattern and Calculating 3

Key mathematical ideas	Counting, Place value, Grouping, Mathematical thinking and reasoning	Words and terms for use in conversation	Explorer Progress Book 3a, pp. 2–3
Educational context	<p>This activity group is to help children and teachers initially become familiar with Numicon Shapes, number rods and number lines, and to make connections between the patterns and structure they see and their number ideas. Actions that represent the symbols for adding, subtracting and equals are also introduced. The activities provide essential opportunities for children who are new to Numicon to put meaning onto this apparatus for themselves, and will give teachers valuable insights into all children's mathematical understanding. These opportunities will help with initial assessing, which in turn may affect how teachers decide to group children. If children are not accustomed to working on open-ended activities some children's initial responses may be superficial, consequently they will need encouragement to persevere until they develop confidence to find out things for themselves.</p> <p>Depending on children's responses, allow one or two weeks for these activities, before moving on to activity groups Calculating 1, Numbers and the Number System 1, and Pattern and Algebra 1, which will help with assessing children's fluency with adding and subtracting facts, their understanding of counting, grouping and place value and their awareness of inverse.</p>	<p>number names, pattern, next, before, after, in between, ordinal number words (first, second, third, etc.), words for comparing (small, smaller than, smallest, long, longer than, longest, few, fewer than, fewest, etc.), set, add, subtract, take away, altogether, equal, visualize</p> <p>Assessment opportunities</p> <ul style="list-style-type: none"> Look and listen for children who: Use the words and terms for use in conversation effectively in discussion. Can notice and describe the attributes of Numicon Shapes and number rods, and use these to sort both Shapes and number rods in different ways. Can refer to Numicon Shapes and number rods by number name, order them and describe relationships between them. Can connect Numicon Shapes, number rods, numerals, and number words with positions on a number line. Can recognize and use the language for adding and subtracting and who can recognize and use the symbols +, – and =. May need to spend longer on these Getting Started activities. May have continuing difficulties and are likely to need additional and different support. Consideration may be given to running the Numicon Intervention Programme for these children. <p>Learning opportunities</p> <ul style="list-style-type: none"> To connect Numicon Shapes with number ideas. To connect number rods with number ideas. To connect Numicon Shapes, number rods, numerals and number words with positions on a number line. To begin to see patterns in number relationships reflected in physical materials and imagery. To learn to describe number relationships using the words and terms for use in conversation. To revise the mathematical language for adding and subtracting. To learn actions representing the symbols for +, – and =. 	<p>After completing work on this activity group, give small focus groups of children their Explorer Progress Books and ask them to work through the challenges on the pages. As children complete the pages, assess what progress they are making with the central ideas from the activity group. Refer to the assessment opportunities for assistance.</p> <p>Explore More Copymaster 1: Talk Time</p> <p>After completing work on Activity 5, give children Explore More Copymaster 1: Talk Time to take home.</p> <p>Focus activities</p> <ol style="list-style-type: none"> What can you do with Numicon Shapes? What can you do with number rods? Knowing the Numicon Shape patterns Exploring the Numicon Display Number Line Describing relationships between Numicon Shapes Cover the board with Numicon Shapes Adding and subtracting with Numicon Shapes or number rods
			Number, Pattern and Calculating 3 ° Activity Group Summary ° Getting Started: Getting started with Number, Pattern and Calculating 3

	Group: Name: Name: Name:	Name: Name: Name: Name:
By this point, children should be able to:		
Fluently recall adding and subtracting facts of all numbers to 10 and use these when adding lists of small numbers		
Fluently recall most adding and subtracting facts of all numbers to 20 and use efficient strategies to calculate those not known		
Know and use patterns in adding and subtracting facts for any number to 20 and beyond to recall facts, to organize them systematically, and to check that all combinations have been found		
Use known adding and subtracting facts to derive facts to 30		
Explain how three related numbers are connected through the inverse relation and write all the related adding and subtracting facts		
Use understanding of equivalence, the '=' symbol and knowledge of the inverse relation between adding and subtracting to solve problems where the □ symbol represents an unknown number		
Give a sensible estimate of numbers of more than 100 objects		
Count aloud across multiples of 100 and multiples of 1000		
Read, write and build (with apparatus) 2- and 3-digit numbers		
Relate grouping and place value notation to say the value of each digit in a 3-digit number		
Understand the use of zero as a place holder		
Know that multiples of 10 and 100 are important milestones on the number line		
Count forwards and backwards in sequences of multiples within their working range		
Recognize when a given number is a multiple of 2, 3, 4, 5, 8, or 10 (at this stage a few children may recognize common multiples but this is not a milestone)		
Notice patterns in sequences of multiples, explain the rule for the sequence and use this to find missing numbers		
Know how to adjust calculations and compensate when adding and subtracting 9 and when to use this relationship		
Recall and use adding and subtracting facts to 10 and the bridging strategy in any adding and subtracting calculations that involves crossing multiples of 10, and explain the steps they have taken		
Understand that multiplying is a form of calculating used instead of repeated adding and recognize when they need to multiply to solve a problem		
Read multiplying number sentences		
Read and write multiplying sentences using the 'x' symbol, model them with structured apparatus showing understanding of the word 'product'		

Preparation and check lists

Day 1 – Focus Teaching Activity 1 - Have ready:

- Numicon shapes (empty them out of the boxes into a large plastic container)
- Extra 10- shapes

Day 1 – Activity 2 - Have ready:

- Cuisenaire rods

Day 2 – Activity 3 - Have ready:

- Individual Numicon shapes hidden in Feely Bags
- Counters or Numicon pegs

Day 2 – Activity 4 - Have ready:

- Numicon shapes
- Feely Bags
- Display Number line

Day 3 – Activity 5 - Have ready:

- Numicon shapes
- Cuisenaire rods
- Feely Bag
- Explore More copymaster 1 – Talk Time

Day 3 – Activity 6 – Have ready:

- 2 sets of Numicon shapes 1-10 per pair of students to work together on this task
- Baseboard laminates – grey side or plastic ones, 1 per pair

Day 4 – Activity 7 – Have ready:

- Numicon shapes
- + and – and = symbols on flashcards
- Numeral cards – from Photocopy Master (PCM) 36
- Subtracting covers – students can cut their own from Photocopy Master (PCM) 46
- Numicon Interactive Whiteboard Software – optional
- Explore Progress books – pages 2 and 3 for each student to complete in their independent activities

Please note: Take two weeks if necessary- don't be rushed through these foundational activities

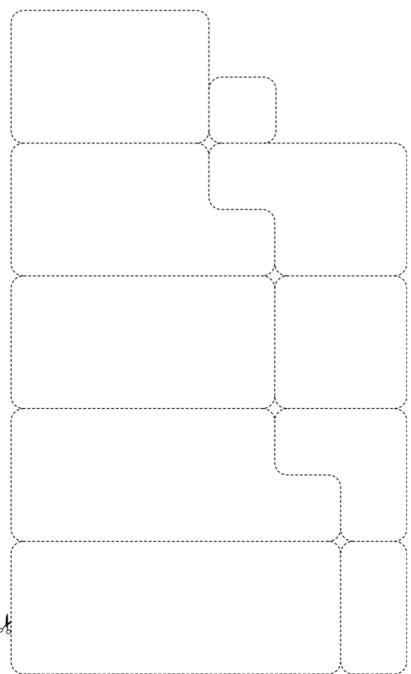
Independent Activities Summary:

- Individual work for most of the activities are repeats or extensions of what the students have done in the Focus Teaching Activities
- The apparatus is the same as the activity groups, except for needing more sets of Numeral Cards 1-100

 $+$ $-$ $=$ $<$ $>$

Photocopy Masters (PCM)

Subtracting Covers 48



Number, Pattern and Calculating 5

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Apparatus



Numicon shapes



0-100 Number line



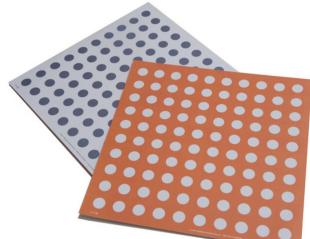
Numicon Display number line



Pegs & Counters



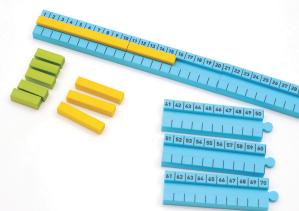
Numeral cards



Baseboard laminates -Use the grey side with whiteboard marker pens



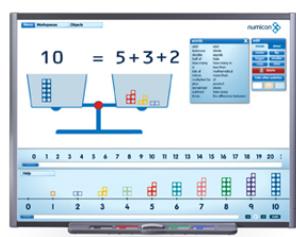
Cuisenaire Rods



Number rod track



Feely Bag



Numicon Interactive Whiteboard Software

Strand and title:

		Date:				
		Monday Class Warm-up:	Tuesday Class Warm-up:	Wed Class Warm-up:	Thurs Class Warm-up:	Friday Class Warm-up:
Short-term planning						
Activity groups						
Learning opportunities for the class		•				
Words and terms for use in conversation						
Assessment opportunities		Look and listen for children who: •				
Focused Group Work						
Independent Work						
Plenary- Whole class						
Resources		Homework: Explore More pp.				Assessment: Explorer Progress pp.