OXFORD UNIVERSITY PRESS

numicon®

Numicon - all learners in NZC Levels 1- 4

- Representational
- Can 'see' relationships
- Multi-sensory
- All strands
- Cross- curricular
- Intervention
- High Learning Needs/Gifted
- Evidence based
- Teaching Handbook & Implementation Guide
- Built in Assessment
- Homework support

Characteristics of the teaching activities

- Meaningful contexts
- Conversations and inquiry
- Exploring relationships and patterns
- Activities making connections with their real world, generalizing
- Sequential, explicit lessons with step-by-step illustrations

Whole class activities

Focused teaching in small groups

Independent group/paired

Maths - patterns and relationships, and using them to solve problems!

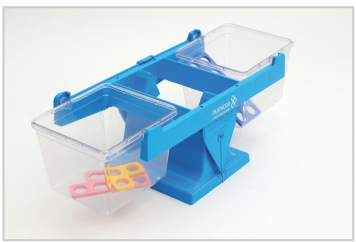
We often underestimate the difficulties children have understanding abstract ideas without pictures to help them. It's comparable to teaching children reading without any pictures in the books.

The Numicon shapes and patterns provide children **with pictures of numbers** that show the *nature* of numbers as well as their *relationships*. Numicon enables children to really 'see' how numbers and number system works.

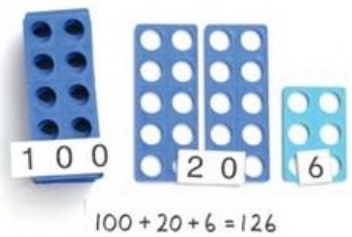
The Numicon Approach – Communicating Mathematically, Exploring Relationships, Generalising

Explicit and progressive activities helps teachers provide a comprehensive programme of learning for all children. They teach with confidence.

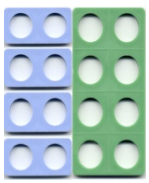
It has been proven by research that by adopting the Numicon approach to maths and following the teaching programme, children are helped in **securing the essential building blocks** of maths understanding, giving them the best chance to be successful in maths all their lives.



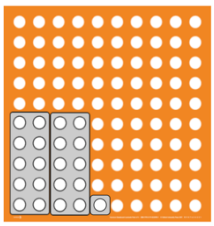
Equivalence



Place Value



Fractions



Decimals/Percentages

What does it mean for children?

- Children enjoy the visual, practical open-ended activities
- Recognise the maths found in everyday situations
- Conversation enabling children of all abilities to achieve more.
- Confidence in themselves as mathematicians and persist in finding solutions.

What does it mean for teachers?

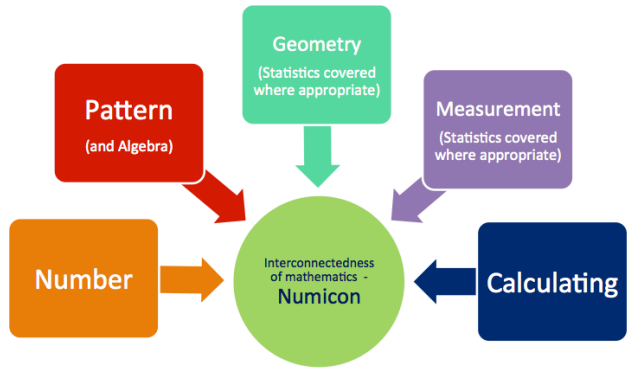
- Confidence and consistent teaching
- Seeing children understanding and enjoying maths!
- Assessment becomes very obvious- they can see what a child is thinking
- Sequenced approach and planning provided across the school and incorporating other curriculum areas
- Ongoing PD through the use of the Teaching Resources

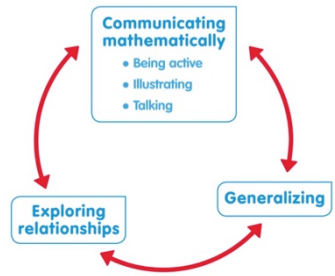
Numicon and the New Zealand Curriculum

Numicon fits well with the NZ Curriculum and National Standards.

From preschool, the Numicon teaching activities develop ***number and algebra together***. Children explore the **pattern, order, position and size of numbers** and **understand them in relation to other numbers.** They are introduced to the **language and actions of number operations** as equations and expressions. They explore **all** the strands' concepts in the context of real life activities.

- Activities in all the strands interweave building confidence for strategies to be easily understood and applied in the context of everyday life
- Activities teach the application of a **range of different strategies** to solve problems and **understand the connections** between them.
- The same apparatus is used from early childhood through to illustrating mathematical concepts at Year 10!
- Language of maths is explicitly taught
- The activities build on previously learned concepts in a structured and inter-connected way.
- They **apply their number and algebra skills** to conduct investigations, solve problems, communicate their reasoning and apply them in all the strands of the mathematics curriculum.





NUMICON	Firm Foundations Breaking Barriers	Numicon 1 Breaking Barriers	Numicon 2 Breaking Barriers	Numicon 3 Breaking Barriers	Numicon 4	Numicon 5	Numicon 6
Similar to NF Stages	0-3	0-4	Early 5	Late 5	6	7	8+
NZ Curriculum Levels	Early 1	1	2	2/3	3	4	4+
National Standards	By the end of Year 2		By the end of Year 3	By the end of Year 5	By the end of Year 6	By the end of Year 7	By the end of Year 8
Typical year level	Early Childhood New Entrants	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

Key Mathematical ideas in Numicon 1 - 4

Teaching Progressions can be found under Supporting Resources on www.numicon.co.nz. These show when to connect NPC and GMS into your programme during the year.

	Number, Pattern and Calculating	Geometry, Measure and Statistics
Numicon 1	• Counting objects to at least 30 • Ordering numbers to 20 • Counting in two's, five's, and ten's • Understanding place value of 2-digit numbers • Reading, writing and understanding +, -, <, > • Adding and subtracting facts to 10 • Recognising halves and quarters of wholes	• Making tiling, repeating and growing patterns • Making, naming and sorting 2D and 3D shapes • Exploring properties of 2D and 3D shapes • Giving directions, describing, turns and rotations • Comparing and ordering mass, capacity and length • Understanding time duration • Telling the time to the hour and half hour • Understanding money
Numicon 2	• Patterns and sequences of 2s, 5s, and 10s • Counting to 100 and beyond • Comparing and ordering numbers to 100 • Recognise the place value of 2-digit number • When/how to add/subtract to solve problems • Adding and subtracting facts to 20 • Working with multiplying and dividing • Recognising halves, quarters and thirds of wholes • Understanding fractions as numbers	• Making and classifying polygons • Identifying/describing faces, edges, vertices of 3D • Symmetrical patterns, identifying lines of symmetry • Identifying and naming prisms • Exploring fractions of rotations • Creating block graphs and bar graphs • Telling the time to five minutes, including quarter past/to the hour
Numicon 3	• Developing fluency - + - in 2- and 3-digit numbers • Exploring multiplying and dividing • Partitioning 2- and 3-digit numbers • Comparing and ordering numbers to 1000 • Using apparatus and imagery in + - x ÷ • Understanding fractions of a wholes & numbers • Using fraction notation	• Building skeleton 2D and 3D shapes • Identifying regular and irregular polygons • Making and identifying right angles and types of lines • Sorting 2D and 3D shapes using sorting diagrams • Describing position and movement on a grid • Telling the time (analogue and digital) 12-hour clocks • Measuring mass, capacity, length using standard units • Understanding discrete and continuous scales
Numicon 4	• Understanding place value in 4-digit numbers • Ordering and comparing numbers to 1000+ • Developing fluency with mental and written methods for adding and subtracting • Developing fluency with multiplying and dividing facts to 12 x 12 • Developing fluency with mental and written methods for multiplying and dividing • Exploring negative numbers • Exploring decimal fractions • Exploring equivalent fractions	• Sorting/classifying triangles and quadrilaterals • Making/identifying symmetrical figures • Making/identifying types of angles in polygons • Plotting /reading co-ordinates in the first quadrant • Describing/drawing translations on a co-ordinate grid • Measuring mass, capacity and length using decimals • Calculating area and perimeter of rectilinear shapes • Collating, comparing, presenting monetary data • Reading/creating tables and graphs • Telling the time (analogue/digital 24-hour clocks) • Time duration

Breaking Barriers covers a summary of the concepts in Numicon 1, 2 and 3 at a pace to enable students with high Learning Needs to participate in the same class environment as their peers. Numicon supports inclusive education practice.

Numicon Intervention Programme covers the key mathematical ideas in Numicon 1, 2, and 3 in a 12-15 week intervention either as part of the classroom environment or in a separate environment. A Diagnostic Assessment in mathematics determines the starting point and teaching programme for each student to close the gap between the students who are struggling and their average-achieving peers.

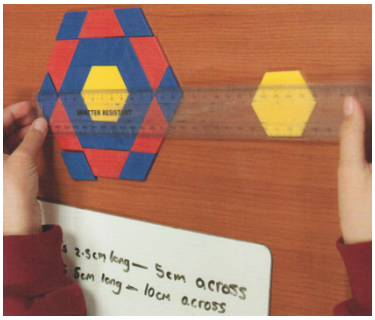
'**Investigations with Numicon'** teaching book contains ten open-ended investigations with a low threshold and high ceiling, with the potential to stretch children to Level 3 and beyond of the NZ Curriculum. Suitable for bright children in maths, including bright children who are not succeeding in mathematics known as 'twice exceptional'.

Key Mathematical ideas in Numicon 5 and 6

Teaching Progressions can be found under Supporting Resources on www.numicon.co.nz. These show when to connect NPC and GMS into your programme during the year.

Numicon 5	• Reading/working -digits & multiples to seven places • Interpreting negative numbers in context • Recognise/describe linear number sequences, rules • + And - numbers 4 plus digits, algorithms reasoning • Square numbers (2) and cubed (3) • Scaling by simple fractions and simple rates • Fractions –multiples, equivalent, tenths and hundredths, mixed, improper fractions • + And – fractions, x proper fractions/mixed numbers • Decimal -fractions, hundredths, tenths & decimal equivalents, rounding • Per cent %, fraction and as a decimal • Percentage & decimal equivalents of ½, ¼ 1/10, with a multiple of 10 or 25	• Convert between different units of metric measure and solve problems involving converting between units of time • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of rectangles • Estimate volume • Use all four operations to solve problems involving measures using decimal notation, including scaling. • Angles -drawn, measured in degrees • Line graphs, complete, read and interpret information in tables, including timetables
Numicon 6	• Read, write, order and compare numbers to 10 million • use negative numbers and calculate across 0 • long multiplication up to 4 digits • long division up to 4 digits, and interpret remainders as whole number remainders, fractions, or by rounding • common factors, common multiples and prime numbers • Addition and subtraction multi-step problems in contexts • common factors to simplify fractions • + - fractions with different denominators and mixed numbers, multiply simple pairs of proper fractions, divide proper fractions by whole numbers • calculate decimal fraction equivalents for a simple fraction • identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 • multiply one-digit numbers with up to 2 decimal places • written division methods in cases where the answer has up to 2 decimal places • equivalences between simple fractions, decimals and percentages, including in different contexts • use integer multiplication and division facts where missing values can be found • calculation and comparison of percentages • solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples • simple formulae and linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with 2 unknowns • enumerate possibilities of combinations of 2 variables	• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places • Convert between miles and kilometres • Recognize that shapes with the same areas can have different perimeters and vice versa • Recognize when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3] • Draw 2-D shapes using given dimensions and angles • Recognize, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognize angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles • Describe positions on the full coordinate grid (all 4 quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes • Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average

Geometry, Measurement & Statistics



GMS is integrated logically to link in with the learning in NPC.

Numicon covers all the strands in a meaningful and logical way that helps children make the connections between the strands and to an every day life context.

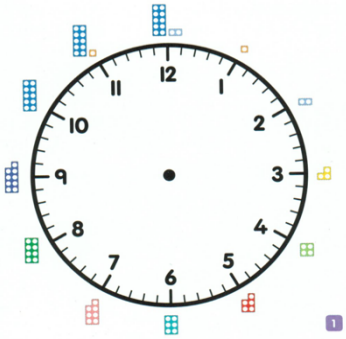
Strand and activity group number		Activity group title
Geometry	2	Making pictures, shapes and patterns
Calculating	4	Exploring adding and subtracting facts to 10
Measurement	4	Comparing, ordering and measuring heaviness
Calculating	5	Halves and quarters of wholes
Measurement	5	Comparing, ordering and measuring capacity
Pattern and Algebra	2	Reasoning
Pattern and Algebra	3	Odd and ev
Calculating	6	Understand
Geometry	3	Recognizing
Numbers and the Number System	3	Exploring n
Calculating	7	Developing
Numbers and the Number System	4	Structure of
Pattern and Algebra	4	Logic
Geometry	4	Comparing
Calculating	8	Adding mo
Calculating	9	Partitioning
Measurement	6	Telling the t
Pattern and Algebra	5	Finding pos
Geometry	5	Position, dir

Strand and activity group number		Activity group title
Getting Started		Getting started with Number, Pattern and Calculating 2
Numbers and the Number System	1	Counting to 100 and beyond
Pattern and Algebra	1	Exploring different patterns
Calculating	1	Adding and writing adding sentences
Calculating	2	Subtracting and writing subtracting sentences
Numbers and the Number System	2	2-digit numbers
Calculating	3	Ordering add
Pattern and Algebra	2	Exploring the
Numbers and the Number System	3	More 2-digit
Numbers and the Number System	4	Comparing a
Pattern and Algebra	3	Exploring equ
Measurement	1	Introducing a
Calculating	4	Adding and s
Geometry	1	Making and s
Geometry	2	Identifying the
Calculating	5	Adding and s
Geometry	3	Investigating
Pattern and Algebra	4	Odd and even
Calculating	6	Partitioning in
Pattern and Algebra	5	Patterns and
Calculating	7	Adding and s

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
Calculating	15	Explori
Measurement	3	Measu
Measurement	4	Calcul
Calculating	16	Making
Measurement	5	Measu
Measurement	6	Measu
Numbers and the Number System	7	Under
Numbers and the Number System	8	Using
Pattern and Algebra	5	Findin
Geometry	4	Using

Strand and activity group number		Activity group title
Pattern and Algebra	3	Exploring 'equals' in balancing number sentences
Calculating	10	Exploring the distributive property and developing written methods of multiplying
Calculating	11	Using multiplying facts to solve dividing problems
Pattern and Algebra	4	Exploring multiples and factors
Calculating	12	Developing fluency with the short written method of multiplying
Calculating	13	Developing fluency with the short written method of dividing
Calculating	14	Solving problems involving more than one step
Measurement	1	Finding
Pattern and Algebra	5	Looking
Geometry	4	Reading
Numbers and the Number System	7	Explorir
Numbers and the Number System	8	Introdu
Measurement	2	Calcula
Measurement	3	Unders
Measurement	4	Unders
Measurement	5	Unders
Pattern and Algebra	6	Solving
Measurement	6	Unders
Pattern and Algebra	7	Explorir

Strand and Activity Group Number		Activity Group Title
Getting Started		Getting started with apparatus and imagery
Numbers and the Number System	1	Working with numbers up to a million
Numbers and the Number System	2	Exploring equivalence with fractions
Numbers and the Number System	3	Understanding decimals
Geometry	1	Measuring angles
Calculating	1	Developing fluency with adding and subtracting calculations and understanding inverse relationships
Calculating	2	Strategies for bridging when adding and subtracting mentally
Numbers and the Number System	4	Estimating and rounding
Calculating	3	Further strategies for adding and subtracting
Pattern and Algebra	1	Exploring sequences and number patterns
Geometry	2	Transformations
Numbers and the Number System	5	Working with negative numbers
Calculating	4	Developing fluency with multiplying and dividing
Numbers and the Number System	6	Comparing and ordering fractions
Pattern and Algebra	2	Using inverse relationships to solve problems
Calculating	5	Written methods of adding
Calculating	6	Written methods of subtracting
Calculating	7	Multiplying and dividing by 10, 100 and 1000
Measurement	1	Metric and imperial units
Pattern and Algebra	3	Properties of number
Calculating	8	Using mental methods for multiplying and dividing
Calculating	9	Division with remainders
Geometry	3	Exploring angles

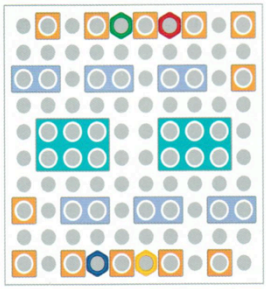


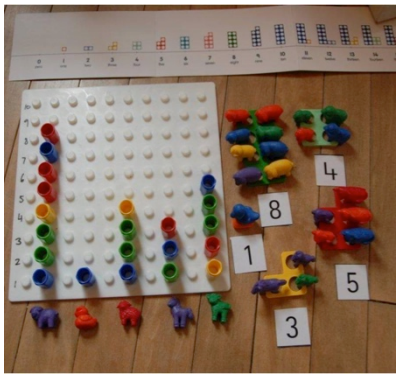
Activity 8: Moving around an obstacle course game board

Have ready: Numicon Baseboards or Paper Baseboards (photocopy master 18), Numicon Shapes, Numicon Coloured Pegs, Numicon Spinners and Spinner Overlays (1, 1, 1, 2, 2 and movement instructions cut from photocopy master 32), Movement Instruction Cards (cut from photocopy master 14), *Numicon Software for the Interactive Whiteboard* (optional)

Step 1

Set the scene by explaining that children are going to be making a game. Ask them to place Shapes on a Baseboard to create obstacles, e.g. Fig. 3. Give them one Spinner with the instructions 'forwards', 'backwards', 'left', 'right' and 'choose' on, and another with the numbers 1, 1, 1, 2, 2. Agree on starting positions for the Pegs, e.g. Fig. 3.

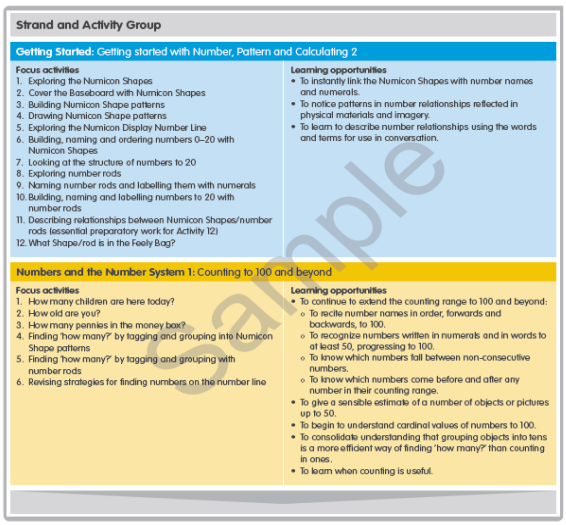




Numicon – Printed resources

Implementation Guide

Teaching Handbook: Long, medium and weekly plans



Strand and Activity Group

Getting Started: Getting started with Number, Pattern and Calculating 2

Focus activities
1. Exploring the Numicon Shapes
2. Cover the Baseboard with Numicon Shapes
3. Building Numicon Shape patterns
4. Drawing Numicon Shape patterns
5. Exploring the Numicon Display Number Line
6. Building, naming and ordering numbers 0–20 with Numicon Shapes
7. Looking at the structure of numbers to 20
8. Exploring number rods
9. Naming number rods and labelling them with numerals
10. Building, naming and labelling numbers to 20 with number rods
11. Describing relationships between Numicon Shapes/number rods (essential preparatory work for Activity 12)
12. What Shape/rod is in the Feely Bag?

Learning opportunities
- To instantly link the Numicon Shapes with number names and numerals.
- To notice 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.

Numbers and the Number System 1: Counting to 100 and beyond

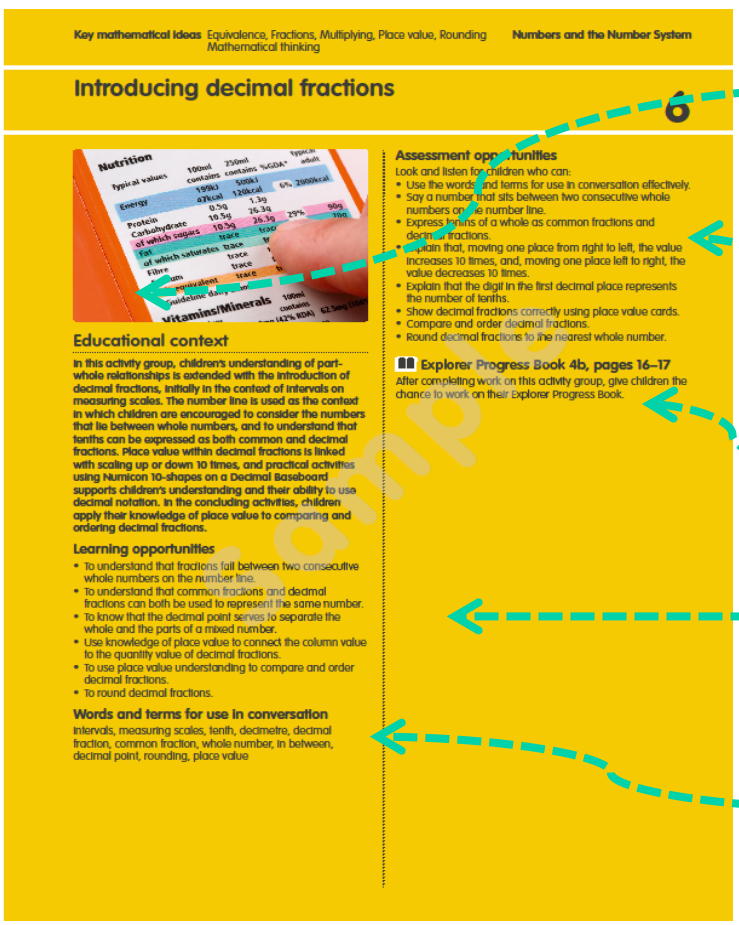
Focus activities
1. How many children are here today?
2. How old are you?
3. How many pennies in the money box?
4. Finding 'how many?' by tagging and grouping into Numicon Shape patterns
5. Finding 'how many?' by tagging and grouping with number rods
6. Revising strategies for finding numbers on the number line

Learning opportunities
- To continue to extend the counting range to 100 and beyond:
  - To recite number names in order, forwards and backwards, to 100.
  - To recognize numbers written in numerals and in words to at least 50, progressing to 100.
  - To know which numbers fall between non-consecutive numbers.
  - To know which numbers come before and after any number in their counting range.
- To give a sensible estimate of a number of objects or pictures up to 50.
- To begin to understand cardinal values of numbers to 100.
- To consolidate understanding that grouping objects into tens is a more efficient way of finding 'how many?' than counting in ones.
- To learn when counting is useful.

Milestones to achieve throughout the year & linked to assessment booklets- Explorer Progress

Milestone 7

By this point, children should be able to:
- Describe objects and number ideas according to their attributes and use these to help solve prob
- Understand a general statement and find particular examples to fit the rule
- Recognize that dividing can be expressed as finding 'how many groups are there in … ?' and rec
  using the '÷' symbol
- Explain and use the inverse relation between multiplying and dividing (with the sequences of 2s, 3s, 5s and 10s)
- Interpret a realistic context as one inviting either 'multiplying' or 'dividing'
- Know that multiplying has a commutative property (and dividing does not) and use this to help when solving dividing questions
- Devise ways of organizing and recording their work systematically, when finding all possibilities and explain how they know they have found all possibilities



Key mathematical ideas Equivalence, Fractions, Multiplying, Place value, Rounding
Mathematical thinking

Numbers and the Number System

Introducing decimal fractions

6

Educational context

In this activity group, children's understanding of part-whole relationships is extended with the introduction of decimal fractions, initially in the context of intervals on measuring scales. The number line is used as the context in which children are encouraged to consider the numbers that lie between whole numbers, and to understand that tenths can be expressed as both common and decimal fractions. Place value within decimal fractions is linked with scaling up or down 10 times, and practical activities using Numicon 10-shapes on a Decimal Baseboard supports children's understanding and their ability to use decimal notation. In the concluding activities, children apply their knowledge of place value to comparing and ordering decimal fractions.

Learning opportunities
- To understand that fractions fall between two consecutive whole numbers on the number line.
- To understand that common fractions and decimal fractions can both be used to represent the same number.
- To know that the decimal point serves to separate the whole and the parts of a mixed number.
- Use knowledge of place value to connect the column value to the quantity value of decimal fractions.
- To use place value understanding to compare and order decimal fractions.
- To round decimal fractions.

Words and terms for use in conversation
intervals, measuring scales, tenth, decimetre, decimal fraction, common fraction, whole number, in between, decimal point, rounding, place value

Assessment opportunities
Look and listen for children who can:
- Use the words and terms for use in conversation effectively.
- Say a number that sits between two consecutive whole numbers on the number line.
- Express tenths of a whole as common fractions and decimal fractions.
- Explain that, moving one place from right to left, the value increases 10 times, and, moving one place left to right, the value decreases 10 times.
- Explain that the digit in the first decimal place represents the number of tenths.
- Show decimal fractions correctly using place value cards.
- Compare and order decimal fractions.
- Round decimal fractions to the nearest whole number.

Explorer Progress Book 4b, pages 16–17
After completing work on this activity group, give children the chance to work on their Explorer Progress Book.

Educational context

Assessment opportunities

Explorer Progress link

Learning opportunities

Words and terms for use in conversation

Numicon – Printed resources

Focus activities

Activity 1: Creating a timetable for today

Have ready: A4 sheets of paper to draw images of events on

Step 1

Ask children 'What are we going to do today?' Encourage them to describe events or repeated actions that they know will happen during that particular school day, e.g. taking the register, assembly, play time, lunch, swimming, home time. As children describe each event, draw a simple representation of each one on a separate piece of paper, e.g. Fig. 1.

Step 2

Discuss with the children that there are so many different things happening during the day that it can be hard to remember them all. Ask how they could use the pictures of events to help remind them. Look and listen for children who suggest organizing the pictures in the order they happen, to create a timeline. Encourage children to arrange the events into the correct order and to describe the choices they are making. Look and listen for children who use language such as earlier, later, before, after, morning and afternoon.

Step 3

Display the timeline from Step 2 in the classroom. As the day progresses, look at the events with the children, discussing things that have already happened and looking forward to the things that are going to happen later on in the day.

Activity 2: Days of the week and weekends

Have ready: A3 sheets of paper, recording devices (optional)

Step 1

Ask children if they know the days of the week, encouraging them to discuss and give their answers. Talk about why days of the week have names. Look and listen for children who suggest that we label the days so that we know what order they come in and we can talk about when things happen.

Make a list of the days of the week on a piece of paper and cut them out. Ask children to separate them into the days they come to school and the days they are away from school. Look and listen for children who can correctly identify the weekend days. Ask them if they know which days are the first and last school days in the week.

Step 2

Now ask children to think of one event for each day of the week and draw it, placing a day label next to it. Ask them to work in pairs and to read out what they do on each day of the week to a partner, e.g. 'On Monday after school I go to the park.'

Step 3

Ask children if they can put their days of the week labels in order and discuss what they are doing with their partner. Look and listen for children using language such as 'before', 'after' and 'next'.

Step 4

Ask children what happens when it gets to Sunday. Talk about how they could show that the days continue. Look and listen for children who arrange their line of labels into a circle. Ask children what day they think should be at the top of the circle. Then, demonstrating a clockwise motion, ask each child to trace their partner's week with their finger and attempt to read the days of the week and say what their partner does on that day.

For some children, remembering the days may be difficult. Think about using a recording device to record the child's sentences in the order of the week. By playing each recording the child can listen and order the days of the week without having to read the labels first.

Activity 3: Sequencing months and birthdays

Have ready: twelve shoe boxes with a hole in each end, string, sticky tape, a small soft toy for each child in the class, sticky labels or A4 paper

Step 1

Ask children how many seasons there are, and if they know the names of them. Discuss what they know about the seasons, e.g. type of weather or particular festivals celebrated. Together, establish the names of the four different seasons.

Step 2

Ask children to take it in turns to say when their birthday is. As children say the months of the year, write them on the board. Establish with children the names of all the months, and fill in any gaps on the board. Write the names of the months on some paper and cut them up into labels.

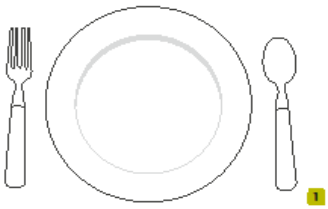


Fig. 1

Focus activities in main teaching system

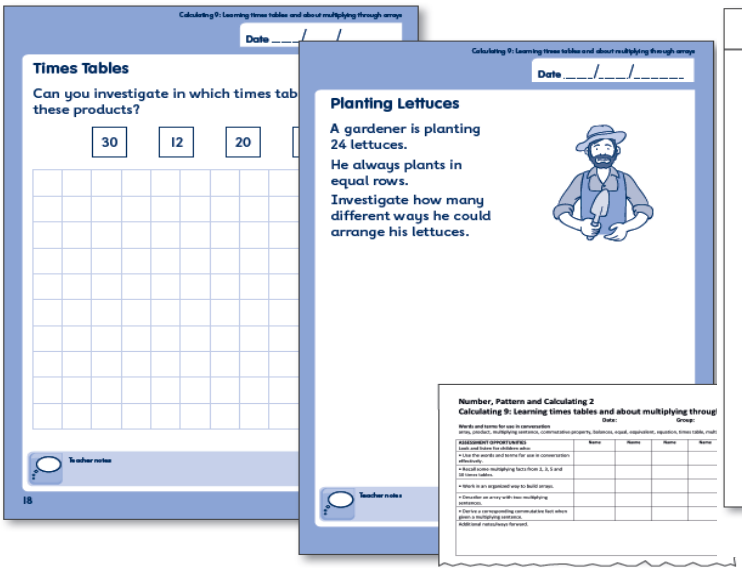
Have ready guidance

Steps of progression

Illustrations to give further meaning to text

Explorer Progress -assessment booklets

Explore More -Homework activities



Numicon does make a difference!

Sense of achievement and confidence for child by 'actively' doing maths

Enhance teachers' subject knowledge, pedagogy and therefore their confidence

Progression, support and challenge for children of all abilities

Skills children in mathematics for 'secondary readiness' and beyond

Easy Buy Packs

- Number Pattern Calculating
- Geometry Measurement Statistics

Apparatus Starter Packs

All products can be purchased separately

Budget for PLD to get the most from NUMICON

www.numicon.co.nz

Assessment – Assessment Opportunities, Gathering Evidence, Tracking

Within the Teaching Handbook, on the introductory page, in every Activity Group, there are details of what to look and listen for.

Assessment opportunities

Look and listen for children who:

- Use the words and terms for use in conversation effectively.
- Name common 3D shapes, irrespective of size and orientation, e.g. cube, cuboid, pyramid, sphere, cylinder, cone.
- Name common 2D shapes, e.g. square, oblong, triangle, pyramid, circle.
- Use the names of 3D shapes to describe real-life objects.
- Distinguish between 2D and 3D shapes.
- Describe the differences between a cube and a cuboid, e.g a cube has all square surfaces.

Assessment activities in the **Explorer Progress Books** allow a student to demonstrate their understanding in a new context, provide an independent record and evidence of their learning.

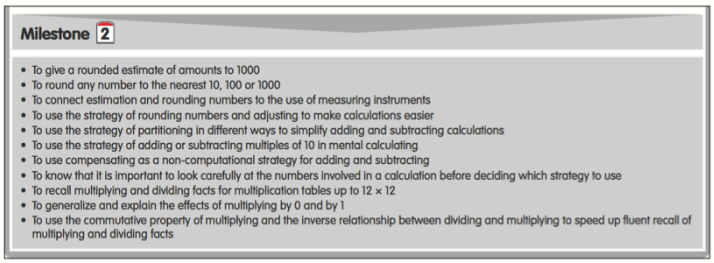
Explorer Progress Book 1, pp. 20–21

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.

After every four or five Activity groups a summary of what has been covered and tracked for each student at a **Milestone.**

A record to track the learning at each **Milestone** is included in the Teaching Handbook

- **Track key concepts and skills**
- **Gives you confidence in tracking over time**
- **Integrated into medium-term planning**


Milestone 2

- To give a rounded estimate of amounts to 1000
- To round any number to the nearest 10, 100 or 1000
- To connect estimation and rounding numbers to the use of measuring instruments
- To use the strategy of rounding numbers and adjusting to make calculations easier
- To use the strategy of partitioning in different ways to simplify adding and subtracting calculations
- To use the strategy of adding or subtracting multiples of 10 in mental calculating
- To use compensating as a non-computational strategy for adding and subtracting
- To know that it is important to look carefully at the numbers involved in a calculation before deciding which strategy to use
- To recall multiplying and dividing facts for multiplication tables up to 12 × 12
- To generalize and explain the effects of multiplying by 0 and by 1
- To use the commutative property of multiplying and the inverse relationship between dividing and multiplying to speed up fluent recall of multiplying and dividing facts

Intervention – 12-15 weeks

The **Numicon Intervention Programme** provides training and resources for *effective* maths intervention with students from Years 3 - 11.

- diagnostic assessment
- qualitatitve assessment
- targeted activities
- guidance on planning
- assessing and reflecting on progress
- next steps beyond intervention

Resources required:
NIP Online Resources, NIP Guide Book and training
Apparatus Pack A
Intervention CD
1 Maths Bag per student

Options of delivery:

- RTLB
- SENCO or Learning Support staff
- Classroom teacher
- Teacher Aide with teacher support

A school or RTLB cluster can only provide this programme after training has been received by a certified Numicon Consultant

Diagnostic Assessment Standardized Testing ⇨ Analysis for the starting point ⇨ Meeting with carers/ parents ⇩ Familiarization Activities ⇦ Intervention Activities ⇦ Review of Understanding

Numicon Intervention Programme

Designed specifically for using with students **with delay in Years 3-11,** covering Level 1 and Level 2 of the NZ Curriculum in Number, Pattern & Algebra, Early Measurement. 12-15 week intervention.

NIP:

- Introduction to school and families
- Diagnostic Assessment
- Planning and Activity Guidance
- Familiarization Lessons
- Intervention Lessons
- Record of Progress
- Homework Resources Guide
- Photocopy Masters

Resources:

Numicon Intervention Programme Guide
Numicon Intervention Programme On line support
Apparatus Starter Pack A Class
Apparatus Starter Pack A 1:1
Maths Bag
NIP Intervention CD

Maths Concepts Link with Numicon 1, 2 and 3

Concepts covered:

Counting Skills to 1000

Pattern & Algebra
- Patterns
- Equivalence
- Odds and evens
- Reasoning
- Greater and less than, < and >
- = sign

Number and the Number System
- Exploring shapes
- Ordering shapes
- Numbers and ordering to 10
- Numbers and ordering to 20, 100
- Grouping in 10's to 100
- Place value to 100
- Skip counting in 2's 5, 10's
- Money, and using money

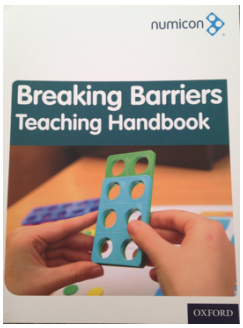
Calculating
- Addition and subtraction to 10, 20
- + and – symbols
- Money- coin equivalence
- Fractions
- Multiplying and dividing
- X and ÷ symbols

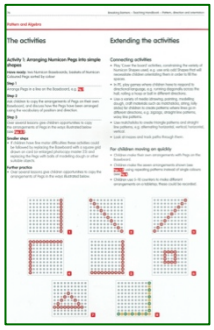
Numicon Starter Apparatus Pack A, Group

Maths Bag and NIP CD

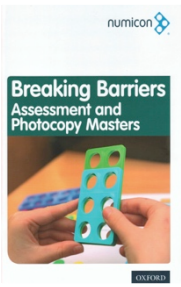
Breaking Barriers

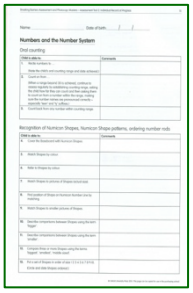
Designed specifically for using with students **with High Learning Needs** covering Level 1 and early Level 2 of the NZ Curriculum in Number, Pattern & Algebra, Measurement. Links with NPC & GMS 1, 2 and 3 for a complete programme.





Breaking Barriers covers:





Counting Skills

Pattern & Algebra
- Patterns
- Equivalence
- Odds and evens
- Reasoning
- Greater and less than, < and >
- = sign

Number and the Number System
- Exploring shapes
- Ordering shapes
- Numbers and ordering to 10
- Numbers and ordering to 20
- Grouping in 10's to 100
- Place value to 100
- Skip counting in 2's 5, 10's

Calculating
- Addition and subtraction to 10
- + and – symbols
- Money- coin equivalence
- Simple Fractions
- Practical Multiplying and dividing
- X and ÷ symbols

Resources:
Breaking Barriers Teaching Pack $200
Breaking Barriers Class Apparatus Pack $400
Breaking Barriers 1:1 Apparatus Pack $240
Prices are subject to change

Early Childhood and New Entrants

1st Steps in the Nursery and at Home- two products for Early Childhood & Home

Firm Foundations
- Learning through play
- Learning the patterns and gaining ''number sense'
- Using the patterns in applied arithmetic
- Addition and Subtraction

High Learning Needs

Breaking Barriers equivalent to Numicon 1 and 2, but differentiated for greater inclusion and support for **intervention** and students with learning/high learning needs at NZC Levels 1-2 -for any age

School Years: Numicon 1 – 6 Teaching Packs

Assessment Booklets

Extra activities of support for home and school

Apparatus Packs A, B, C

Investigations with Numicon

- Gifted &Talented Programme
- Dyslexic students love this!
- Encourages mathematical thinking
- Open investigations with mathematical concepts, ideal for G & T exploration days

Accessories – see website for more

Software for interactive whiteboard

Pan Balance

Further Information

- Replacement books and apparatus are available
- Many schools purchase class sets of little boxes and add them to the student stationery list along with the Assessment booklets
- Use the little boxes of shapes with your class while using the interactive whiteboard software

- Numicon pieces are weighted allowing use of a pan balance and a natural link to understanding equivalence
- The training DVD is a great resource for ongoing PD
- In-school PD is available
- Further support at our website and Oxford Owl

Testimonials

- *"We were really floundering until we began working with Numicon"*
- *"My student has made more progress in these five weeks than he did with five weeks on a regular programme"*
- *It is the highlight of my student's day!"*
- *"Planning is so easy now."*
- *"What I have learned in teaching my student using Numicon, has carried over into other subject areas- the small steps."*
- *We were amazed at the success of Numicon in our remedial programme. The knowledge stayed with the children and they were able to take it back into their regular programme with confidence!"*
- *The training course really helped me gain better understanding of the programme and the decision to implement it as our school Maths curriculum."*
- *We are very impressed that our Year 1 students are well through the equivalent of Stage 4 NPD and onto Stage 5!*

www.Numicon.co.nz
0800 678 581