

# Assessing with Numicon

## A proven approach





Help all your students achieve in Mathematics

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Assessment opportunities

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## Numicon is a multi-sensory approach to understanding mathematics, built on a proven pedagogy that raises achievement across all ability levels

With clear opportunities to assess the understanding of each child, Numicon enables you to confidently inform others within the NZ Curriculum guidelines.

Your students' progress can be carefully tracked and evidenced, so you can ensure every children achieves end of year expectations and is ready for secondary school.



### You can assess with Numicon by:

- Implementing clearly-defined formative assessment opportunities provided in each Activity Group
- Tracking a child's progress over time using defined Milestones
- Using the Explorer Progress Books to capture each pupil's ability to apply their knowledge and understanding to problem-solving

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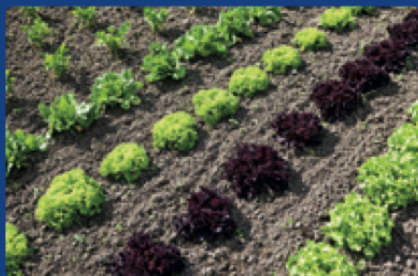
Your next steps

Key mathematical ideas Multiplying, Pattern, Mathematical thinking and reasoning

Calculating

## Developing fluency with multiplying facts to $12 \times 12$

5



### Educational context

This activity group is about revising all the multiplying structures that were introduced in Number, Pattern and Calculating 3, and continuing to develop children's fluency in calculating. The children will meet a range of multiplying problems in a variety of contexts, including correspondence problems where  $n$  objects are connected to  $m$  objects. A variety of imagery is used to support children's understanding, and to support their memorizing times tables facts. Key connections are made to everyday contexts (including measuring) in which multiplying is used. The activities in this group can be adapted with any of the times tables as a focus, according to children's abilities, in order to help them consolidate and learn multiples to  $12 \times 12$  off by heart, both in sequence and at random.

### Learning opportunities

- To interpret an array as a model of multiplying.

### Assessment opportunities

Look and listen for children who can:

- Use the words and terms for use in conversation effectively.
- Write multiplying sentences for problems involving repeated amounts.
- Find products of two numbers on multiplying squares.
- Write two multiplying sentences for an array and notice that, e.g.  $4 \times 6$  and  $6 \times 4$  give the same product.
- Recall multiplying facts to  $12 \times 12$ .
- Explain the effects of multiplying by 0 and by 1.
- Illustrate a scaling problem with apparatus and a multiplying sentence.

### Explorer Progress Book 4a, pp. 20–23

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.

Children will also have the opportunity to complete their Learning Log (p22–23) where they can reflect on the mathematics they have done so far.

### Explore More Copymaster 21: Multiply Game

After completing work on Activity 5, give children Explore More Copymaster 21: Multiplying Game (enlarged to A3) to take home.

Within the Teaching Resource Handbook, assessment opportunities are displayed at the start of each Numicon Activity Group, so you know what to look and listen out for

The **assessment opportunities** outline what to **look and listen for** in whole class, group, and individual work

Activity Groups are matched to pages within **Explorer Progress Books** to help you assess each child individually

Children enjoy learning in a sequential manner with meaningful activities and clear assessment

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### Learning opportunities

- To interpret an array as a model of multiplying.
- To know that multiplying is what we do instead of adding repeated groups.
- To record sequences of multiples systematically in a table, and read products.
- To find products on multiplying squares.
- To know the effects of multiplying by 0 and by 1.
- To learn and improve fluency with the times tables up to  $12 \times 12$ .
- To know that we multiply to find the area of rectangles.
- To recognize that we multiply by numbers greater than 1 to scale up an amount.

### Words and terms for use in conversation

multiply, times, lots of, groups of, sets, array, product, multiplying sentences, multiplication tables, times tables, times tables square, commutative, multiplying facts, multiples, dimension, length, width, rectangle, square, area, multiplied by, scaling, scaled up by

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**Milestones are a robust, reliable resource for ensuring every child meets end of year expectations, giving you evidence of a child's understanding along the way**

## Milestones:

- Mark key concepts and skills to be grasped by each child at regular points throughout the year
- Give you confidence in tracking a child's progress over time
- Are integrated into the medium-term planning materials

### 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  $12 \times 12$
- 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

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**Explorer Progress Books make evidence-gathering simple and effective. They show a pupil's depth of comprehension and give insight into their thought process, making it easy for you to assess their development over time**

Calculating 5: Developing fluency with multiplying facts to 12 x 12

Have ready: timer Date \_\_\_\_/\_\_\_\_/\_\_\_\_

### Times Tables Squares

Record how long it takes you to fill in the answers to this times tables square.


x	3	4	6	7
2				
5				
8				
9				

My time  :

Now time how long it takes you to fill in this square.  
Try to be quicker than you were last time!

x	5	3	9	6
8				
4				
2				
7				

My time  :


 Teacher notes

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Calculating 5: Developing fluency with multiplying facts to 12 x 12

Date \_\_\_\_/\_\_\_\_/\_\_\_\_


### A Multiplying Game



Kristina's game involved throwing two 0-9 dice and multiplying the two numbers together each time.

How many different ways can she get a score of at least 30, but not more than 40?  
(Throwing a '7' and an '8' would not work because  $7 \times 8 = 56$ , and that is more than 40.)

Can you explain how you know that you've found all the different ways?

 Teacher notes

## Explorer Progress Books:

- Allow a child to demonstrate their ability to apply their understanding in a new context
- Provide an independent record of success for every pupil
- Are ideal for gathering evidence of progress

Children enjoy seeing their progress with these activities

Have ready: timer

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

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×	3	4	6	7
2				
5				
8				
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My time

_____ : _____
---------------

Now time how long it takes you to fill in this square.

Try to be quicker than you were last time!

×	5	3	9	6
8				
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7				

My time

_____ : _____
---------------



Teacher notes

Date \_\_\_\_/\_\_\_\_/\_\_\_\_

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Numicon Books	NZC Level	National Standards	Number Framework
Firm Foundations Breaking Barriers	Level 1	During Year 0	Stages 0 - 3
Numicon 1 Breaking Barriers Numicon Intervention Programme (NIP)	Level 1	After 1 year at school	Stage 4
Numicon 2 Breaking Barriers NIP	Level 2	After 2 years at school	Stage 5
Numicon 3 Breaking Barriers NIP	Level 2	After 3 years at school	Stage 5
Numicon 4 Big Ideas Investigations	Level 3	After 4 years at school	Stage 6
Numicon 5 Big Ideas Investigations	Levels 3/4	After 5 years at school	Stage 7
Numicon 6 Big Ideas Investigations	Level 4	After 8 years at school	Stage 8

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## Your next steps...

- Contact [info@numicon.co.nz](mailto:info@numicon.co.nz)
- Visit [www.numicon.co.nz](http://www.numicon.co.nz) for more information about Numicon and the latest developments in assessment
- Download editable milestone grids for individual and groups on [Oxford Owl](#)

### How to get in touch:

Web: <http://www.numicon.co.nz>

Email: [info@numicon.co.nz](mailto:info@numicon.co.nz)

Tel: 0800 678 581