Assessing with Numicon
A proven approach at a time of change
Help all your pupils achieve in mathematics

Introduction
Assessment opportunities
Tracking progress
Gathering evidence
Your next steps

Ready for National Curriculum 2014
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 approach the increased demands of the new National Curriculum.

Your pupils' progress can be carefully tracked and evidenced, so you can ensure every child 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
Teaching Resource Handbook

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.

### Key mathematical ideas
- Multiplying, Pattern, Mathematical thinking and reasoning
- Calculating

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

#### 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 them 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.
- To learn the multiplication tables up to 12 \times 12.
- To recognize that we multiply by numbers greater than 1 to scale up an amount.
- To know the effects of multiplying by 0 and by 1.
- To know that we multiply to find the area of rectangles.
- To find products on multiplying squares.
- To record sequences of multiples systematically in a table, and read products.
- To write multiplying sentences for problems involving repeated amounts.
- To use the words and terms for use in conversation effectively.

#### 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.
Developing fluency with multiplying facts to 12 × 12

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 them 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 × 12 off by heart, both in sequence and at random.

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 × 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

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 × 6 and 6 × 4 give the same product.
- Recall multiplying facts to 12 × 12.
- Explain the effects of multiplying by 0 and by 1.
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Explore More Copymaster 21: Multiply Game
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With National Curriculum assessment levels no longer supported, 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 × 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
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.

**Assessment opportunities**

**Calculating 5: Developing fluency with multiplying facts to 12 × 12**

**Times Tables Squares**

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

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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!

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My time __ : __

**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?

**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
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Your next steps…

- Contact your local Educational Consultant to discover more about Numicon: primary.enquiries@oup.com

- Visit www.oxfordprimary.co.uk for more information about Numicon and the latest developments on assessment

- Download free editable milestone grids for individuals and groups on Oxford Owl: www.oxfordowl.co.uk/for-school