





# Firm Foundations

## Revised Edition

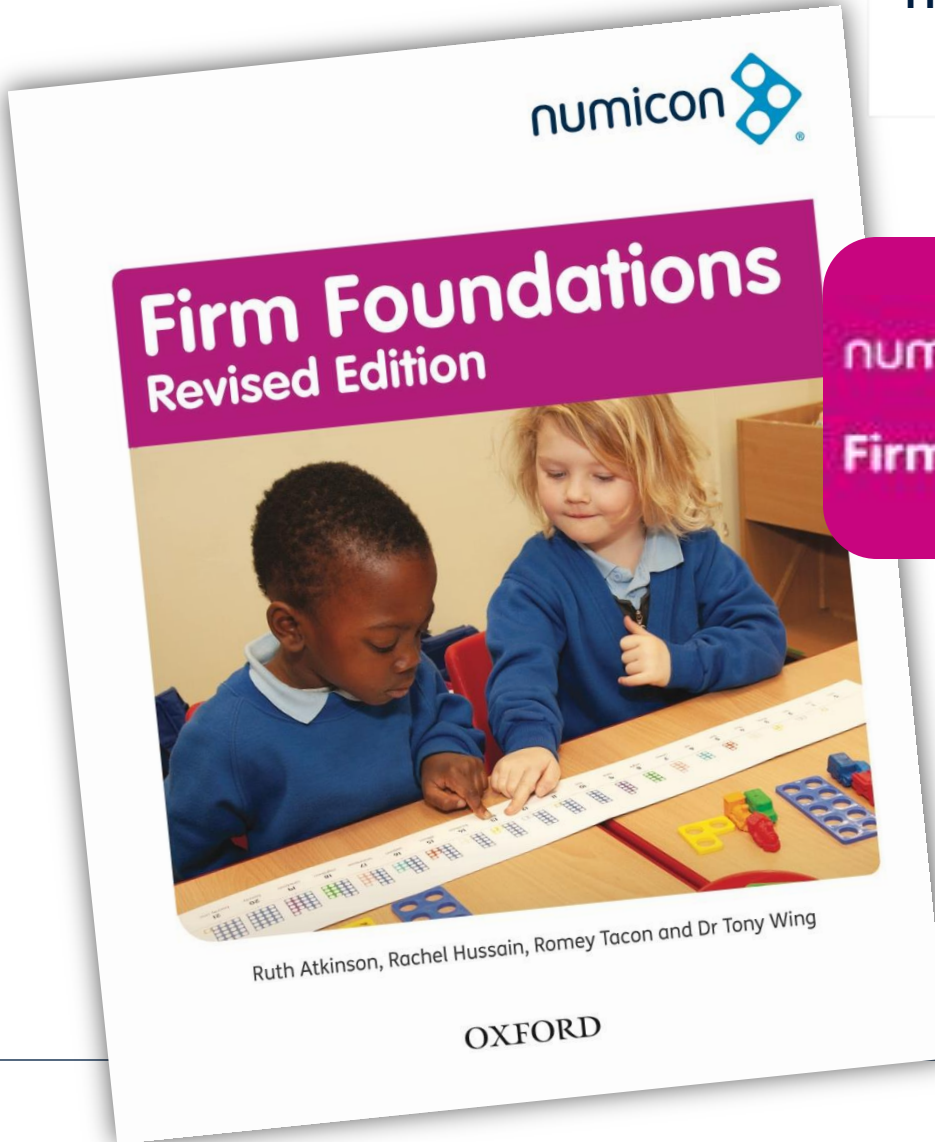


Suitable for all Early Years settings

## So, what's included?

Firm Foundations  
Online  
Subscription

Firm Foundations  
Apparatus Pack  
and more!



numicon  online  
Firm Foundations



## Numicon Firm Foundations

Comprehensive and varied programme of Maths activities based on a proven approach to teaching and learning mathematics that builds deep understanding for every child, firmly placing the teacher as an exemplar mathematical communicator

- Teaching and activities for indoors and outdoors
- 18 activity cards covering Years 0 and 1 mathematics for the NZ curriculum
- Uses stories, songs and rhymes and includes cross curricular links
- Includes assessment opportunities throughout
- Covers Shape, Space and Measure
- Teaching Resource Handbook
- Firm Foundations Online
- Firm Foundations Apparatus pack

*Firm Foundations prepares children for the rest of their lives in maths!*

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## **Assessment in Numicon Firm Foundations**

As children work on the Numicon activities you can assess their ability to:

### **Communication and Language**

- Make comments about what they have heard and ask questions to clarify their understanding
- Hold conversation when engaged in back-and-forth exchanges with their teacher and peers
- Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary
- Offer explanations for why things might happen, making use of recently introduced vocabulary
- Express their ideas and feelings about their experiences using full sentences

### **Personal, Social and Emotional Development**

- Set and work towards simple goals, being able to wait for what they want and control their immediate impulses when appropriate
  - Give focused attention to what the teacher says, responding appropriately even when engaged in activity, and show an ability to follow instructions involving several ideas or actions
  - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge
  - Work and play cooperatively and take turns with others
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**Lisa Lalor,**  
Numicon  
Consultant

Firm Foundations supports children to actively engage with mathematical ideas while developing their ability to visualise, which is a fundamental skill children need to learn. Firm Foundations provides step-by-step guidance to support children to develop understanding of numbers that goes beyond recognition of numerals and oral counting...children practically engage with apparatus and images to make concepts less abstract and more 'real' for the children.

Numicon Firm Foundations offers a carefully planned teaching programme with clear progression and sequencing. The teacher's handbook contains everything you need, saving time and ensuring coverage. In the best tradition of early years, the approach is active and child centred.

Accompanying the teaching resources is an online book of songs/rhymes with accompanying activities – Numicon at the Seaside.

**Sue  
Cowley,**  
Author and  
Teacher



# A look inside Firm Foundations

## Teaching Guide and Photocopy Masters

### Introducing Numicon Shape patterns and number rods

Activity Card  
3



In these activities, children begin to build Numicon Shape patterns with Numicon Coloured Pegs on the Baseboard, before moving on to building the patterns with a variety of objects through play and investigation.

As children learn to make the Numicon Shape patterns 1–10 (which takes time) they begin to develop a crucial understanding of the patterns within numbers. They should practise these activities often until they can make and recognize the patterns quickly, accurately and independently.

Finding the matching Shape on the Numicon Display Number Line helps children to connect their understanding of number as an ordered sequence with the understanding that number describes quantity (cardinality).

Although most children will soon learn to subitize up to 5, once they can make the Shape patterns, they can arrange larger amounts of objects to find 'how many' without counting one by one.

Number rods are another structured manipulative used in the Numicon approach. They are introduced in 'All doing maths together', and children explore them by building pictures in independent play.

Activities exploring the relationships between 2D and 3D shapes are included throughout.

Give children the [Home learning activity for Activity Card 3: Two small seahorses](#) (available in [Numicon at the Seaside – At Home](#)). Arrange a 'drop-in' to show parents Numicon, starting it with children performing number rhymes and songs.

#### Watchpoints

Initially, use one colour of Peg to help children see each pattern as a whole. Once familiar, they move on to using a mix of colours.

#### Key mathematical ideas (Teaching Guide, page 14)

The main focus is on:  
Counting, not-counting – seeing numbers as whole objects, pattern and generalizing

Children will also encounter:  
Contrasting, comparing and combining, order, sequences and direction, the successor relationship, part-whole relationships, shape and space, reasoning and logic

#### Communicating

Model these words and terms, and listen for children using them in the same ways as you:

- **Words for counting**, e.g. number names (one, two, three, ...), number, count, how many?, number line, Numicon pattern
- **Words for comparing quantity and size**, e.g. more, fewer, less, same, bigger, smaller, longer, shorter
- **Words for position**, e.g. before, after, next, between, in front, behind, first, last
- **Words for action**, e.g. copy, build, arrange, make, find, match, order, sort, repeat, carry on, continue
- **Geometric shape names**, e.g. triangle, square, oblong, circle, cube, pyramid
- **Words for describing, comparing and contrasting geometric shapes**, e.g. corner, side, curved, straight, flat, solid, face, edge, same as, different from, odd one out

#### Learning opportunities

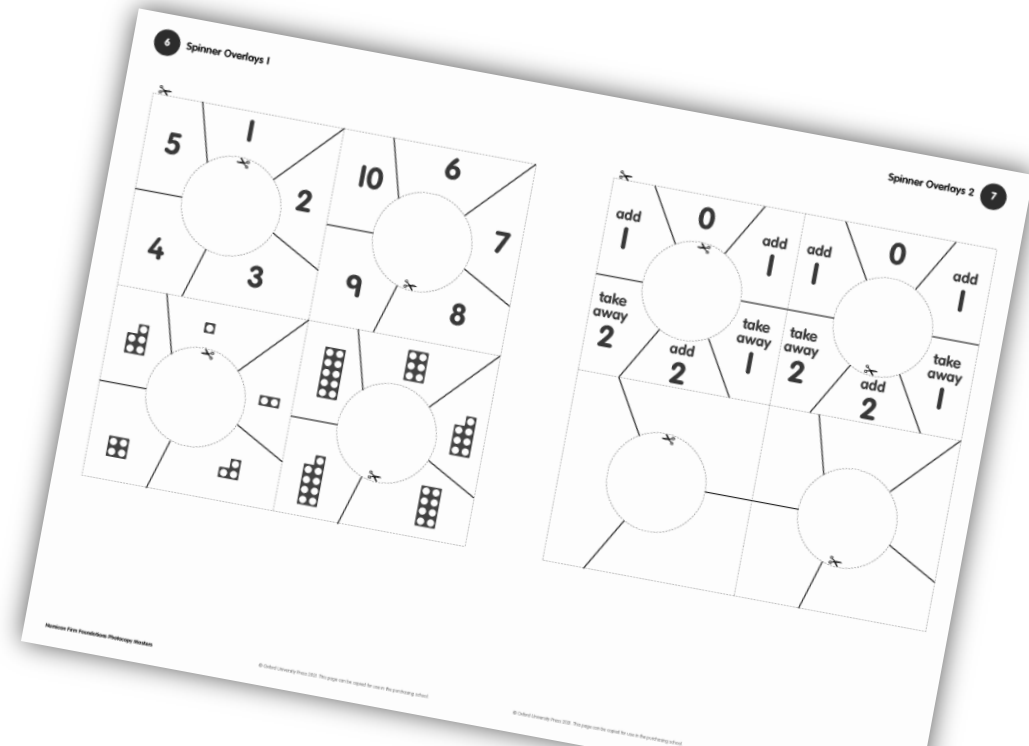
- To recite and extend the count sequence and count collections of objects accurately (increasing in number towards 10).
- To build and recognize Numicon Shape patterns, matching them to Numicon Shapes.
- To recognize that the number idea 2 can be represented in many different ways.
- To use the names of simple 2D geometric shapes.
- To notice and describe some parts and properties of simple 2D and 3D geometric shapes.

#### Assessing

Look and listen for children who:

- Count when they need to find out 'how many' in play situations.
- Build each Numicon Shape pattern using Numicon Coloured Pegs (note children's counting range).
- Identify and name a triangle, square, oblong, circle.
- Copy, continue and devise simple repeating patterns.
- Spot an odd one out in a given set and explain why it is the odd one out.

The Teaching Guide provides information on the Numicon approach, key mathematical ideas, a glossary of mathematical terms, how to use Numicon Online planning and assessment, and what's in the apparatus pack.



Photocopy Masters provide you with all the tools you need to complete the activities.

## All doing maths together with Numicon

- Select activities from:
- Daily routines with Numicon
- Everyday counting with Numicon

Also:

- Continue to count aloud with children as you point to the Numicon Display Number Line (or a Large Format Tabletop Number Line).
- Increased challenge:** choose numbers for children to say the number that comes 'next', 'after', 'before', 'between'.
- Give each child a Shape. Either have two Spinners with **Numicon Shape Colours** (photocopy master available on Oxford Owl) or use **Spinner Overlays** (photocopy master available on Oxford Owl) on the **Numicon Interactive Whiteboard Software**. Any child who has a matching Shape holds it up and points to the Shape on the Display Number Line.
- Children sit in a circle with a Shape each. Roll a pocket dice showing the **Numicon Shapes** (photocopy master on Oxford Owl). Children stand up when their Shape is rolled.
- Show children the box of number rods (see **Teaching Guide**, page 3). Discuss their colours and explain that children will be exploring these themselves.
- Model simple repeating patterns with geometric shapes on the **Numicon IWB** and ask children to suggest other patterns.
- Continue to talk with children about position, time and order. When children are standing in line, talk about their position, e.g. in front, behind, between, first, last.
- Continue to use the visual timetable created in **Activity Card 2**, talking with children about the order of events and using related language, e.g. before, after, first, last.

## Learning about number patterns and relationships

### Activities with Numicon structured manipulatives

#### Activity 1 Matching Numicon Shape patterns and Shapes

**Have ready:** Numicon Shapes 1–10, Numicon Spinners and 1–5 and 6–10 Shape Spinner Overlays (cut from photocopy master 6), Numicon Large Format Tabletop Number Line, Numicon Feely Bag

Provide jumbled Shapes 1–5 and a Spinner showing Numicon Shapes 1–5. Children spin a Shape, find the matching Shape and point to it on the Number Line.



When children are working confidently, extend to 10, providing Shapes 6–10 and a second Spinner showing Numicon Shapes 6–10.

**Increased challenge:** repeat the activity, this time with children feeling for the Shapes in a Feely Bag. Start with 1–5; only extend to 6–10 when children recognize smaller Shapes by touch.



#### Activity 2 Copying Numicon Shape patterns

**Have ready:** Numicon Baseboard, Numicon Coloured Pegs

Use Pegs to make a Numicon 2-, 3- or 4-shape pattern on the Baseboard. Ask children to copy it.

Which Shape pattern will have one more Peg? Which Shape pattern will have one fewer?

Over time, extend until children can make Shape patterns 1–10 independently.



#### Activity 3 More matching Shapes and patterns

**Have ready:** Numicon Baseboard, Numicon Coloured Pegs, Numicon Shapes

Arrange Shapes 1–6 in order. Use Pegs to make a Numicon Shape pattern 1–6 on the Baseboard. Children find the Shape that matches the Peg pattern and check by fitting it over the Pegs. Repeat for other Shape patterns.

#### Activity 4 Making Numicon Shape patterns

**Have ready:** Numicon Baseboard, Numicon Shapes, Numicon Coloured Pegs

Choose a 1–10 Shape. Encourage children to look carefully at the Shape. Children then use Pegs to make the Numicon Shape pattern on the Baseboard and fit the Shape onto it to check.



**Increased challenge:** show children a Shape and then hide it. Ask children to make the pattern from memory.

#### Activity 5 Exploring number rods

**Have ready:** number rods

Sit with children as they explore the number rods, making pictures and shapes. Model language for length and height as you make your own picture.

#### Maths games and puzzles

- Give children Numicon Shapes, and Baseboards and Picture Overlays or **Numicon Shape Outlines** (cut from photocopy master 10) for children to match Shapes to.
- Provide shape-posting toys and geometric shape puzzles.
- Explore geometric shapes with pattern blocks, magnetic shapes or the computer/tablet to make patterns and pictures.
- Provide number rods for children to use to continue making pictures, patterns and different sized shapes including squares, oblongs and triangles.



- Provide Numicon Shapes and collections of small objects: children use the objects to fill the holes in the Shapes and then carefully take the Shapes away to leave the objects arranged in a Numicon Shape pattern.
- Provide a variety of objects for children to count, e.g. toys, natural objects, 'junk' objects (e.g. bottle tops).

**Increased challenge:** encourage children to compare the groups they have counted.

Which group is larger? Which group is smaller?

Which group has more animals in it? Which group has fewer?

## Counting and number Ideas book

**Have ready:** children's **butterflies** (see 'Expressive arts and design', below), prepared page for exploring number 2, Numicon Shapes, pencils, coloured pencils / felt-tip pens / crayons in the Numicon colours, glue stick, a pair of socks, gloves, wellies, pipe cleaners, plate of sand and small copy of **Numicon at the Seaside**

How many socks have we got? What have you got a pair of?

How will you use a pipe cleaner to make a numeral 2?

Can you draw a numeral 2 in sand?

Which crayon matches the number 2 Numicon Shape?

Where does number 2 go on your number line?

Are both sides of your butterfly the same?



## Exploring maths all around us

### Stories, non-fiction, songs and rhymes

- Look out for stories with two characters; share them with the children and ask open questions, encouraging them to make comparisons.

What do you notice about the younger bear?

- When reading daily stories with children, take opportunities to count and use everyday positional language, e.g. to describe where a character is; listen for children who use new vocabulary.
- Sing songs and recite rhymes with children, including actions that involve drawing shapes in the air, e.g. circles for wheels, squares for windows, a triangle for a hat.

### Healthy food activity

- Share information books, pictures and information on the IWB about the importance of eating a range of fruit and vegetables.
- Make healthy sandwiches or toast with healthy toppings with children. They cut them into different shapes, e.g. triangles, squares, oblongs. Encourage children to notice and talk about the shapes within shapes.

What shape will you make?

Will you make one big triangle or two small triangles?



### Role-play, small world and construction

- Lay a table or set out a picnic with children, ensuring that each person has the same place setting and food items. Spot shapes of items with children, e.g. oblong mat.



## Numicon Online Firm Foundations

Brings together all your planning and classroom resources

- eBook version of the teaching handbook with direct links to extra resources
- *Numicon Interactive Whiteboard Software* access
- Assessment tracking resources
- eBook of *Numicon at the Seaside Big Book* and further activity sheets for home learning
- visual references demonstrating exemplar classroom set-ups
- professional development videos
- extra printable photocopy masters

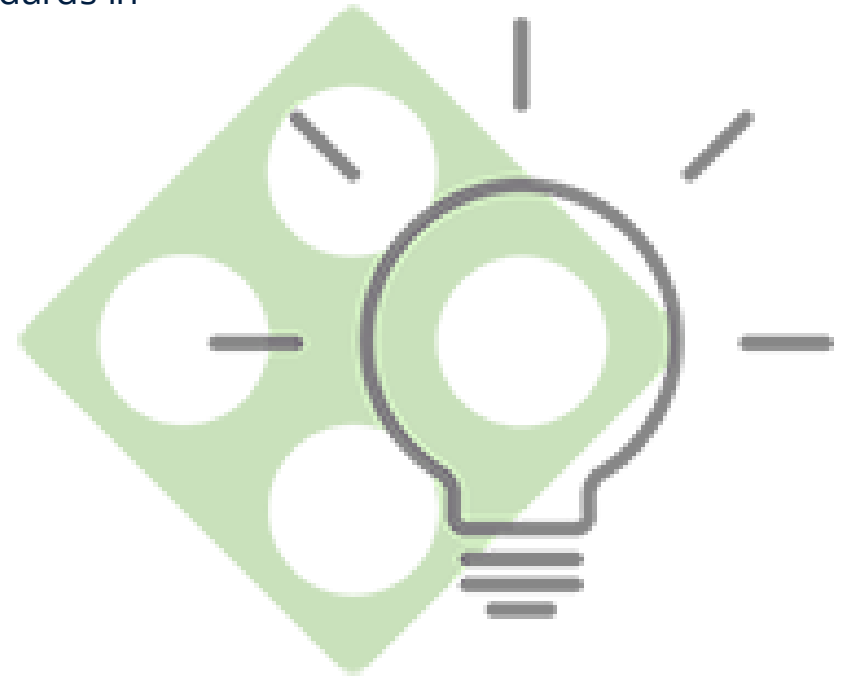


The screenshot shows the Numicon Interactive Whiteboard Software interface. At the top, there are tabs for 'Workspaces', 'Display', 'Delete All', and 'Save'. The main workspace contains a comparison of two groups: '5 ducks' on the left and '3 yellow birds' on the right. The ducks are represented by five yellow duck icons, and the birds by three yellow bird icons. A central box contains the text 'greater than'. Below the ducks is a red Numicon shape (a 2x2 square with a dot in the bottom-right), and below the birds is a yellow Numicon shape (a 2x2 square with a dot in the bottom-right). At the bottom, there is a toolbar with various icons for 'Move', 'Draw', 'Rotate', 'Flip', 'Undo', and 'Delete'. Above the toolbar, there are tabs for 'Numicon Shapes', 'Number Rods', 'Base-ten Apparatus', 'Keypad', 'Pictures', and 'Resources'. The 'Keypad' tab is active, showing a grid of mathematical terms and symbols: 'balances', 'convert', 'difference', 'divide', 'double', 'equals', 'equivalent', 'estimate', 'factor', 'greater than', 'how many', 'less than', 'lots of', 'multiple', 'multiplied by', 'negative', 'order', 'plus', 'positive', 'product', 'remainder', 'subtract', 'take away', 'Words', '123+', and 'Abc'.

## Numicon Professional Development

Join our independent maths consultants either at your nearest workshop or virtually, to become confident and capable in using the Numicon approach to improve standards in your school

- Numicon Professional Development
- Central Courses
- Virtual Courses
- Numicon Digital Bitesize Workshops
- Free Q&A Sessions
- Numicon Inset
- Numicon Catch up and Intervention



## Next Steps

- Book a maths review for your school
- Contact an Advocate School
- Order your Professional Development Training for Numicon

Contact us to arrange any of the above [admin@edushop.nz](mailto:admin@edushop.nz) (The NZ supplier of Numicon)

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