

How Numicon Firm Foundations meets the Early Learning Goals



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Introduction

This document shows how the *Numicon Firm Foundations* teaching programme can cover the Early Years Foundation Stage (EYFS) 2020 and meet the Early Learning Goals (ELGs) for mathematics. These new goals set high expectations, but children who achieve them will have a strong grasp of basic numbers and will start Key Stage 1 ready for mathematics learning.

In this document, you will find the revised Early Learning Goals for the Foundation Stage curriculum and an outline of how they differ from the previous goals. You will also find a chart which links the Numicon teaching programme to the revised goals. *Numicon Firm Foundations* is already broadly in line with the new goals set out by the EYFS curriculum, but some of the activities in the Firm Foundations folder will need to be covered in a different order. The 'How to use the *Numicon Firm Foundations* Activity Cards' section of this document explains how the Numicon activities will enable children to achieve the revised goals by the end of their Reception year.

Key changes to the Early Learning Goals

Here is a short summary of what has been added to and what has been removed from the Early Learning Goals. Specific changes are covered in more detail on the following pages.

There is a more detailed focus on communication and language. This is threaded through all the areas of learning to create a language-rich environment in which children hear and learn to use new vocabulary through conversation, story-telling and role-play. In mathematics, this means children should be encouraged to hear, understand and use the specific mathematical words and terms they meet throughout the Early Years curriculum.

The Early Learning Goals for mathematics have a strong focus on number. The Number and Numerical Patterns Early Learning Goals focus on children developing 'a deep understanding of the numbers to 10', as well as the relationships between the numbers and the patterns found within them.

Counting on and back to find the answer to adding and subtracting questions is no longer included in the Early Learning Goals.

Shape, Space and Measures is no longer an Early Learning Goal. However, it is still a requirement of the curriculum and you will find that the Numicon teaching programme is full of fun and exciting opportunities for learning about this important aspect of mathematics.

The Number Early Learning Goals

There are six Early Learning Goals for mathematics: three for Number and three for Numerical Patterns. This section outlines the expectations of the goals and explains how *Numicon Firm Foundations* meets each one.

Children are expected to:

Have a deep understanding of numbers to 10, including the composition of each number

Unlike other apparatus, such as counters, Numicon apparatus is specifically designed to represent the structure of numbers and the relationships between them. In the practical adding and subtracting activities shown on the Activity Cards, children learn the composition of each number by combining and comparing Numicon Shapes or number rods.



Subitise (recognise quantities without counting) up to 5

In *Numicon Firm Foundations*, children find 'how many' without counting, by arranging objects into Numicon Shape patterns. This is a key step towards children recognising quantities to 5 and beyond. This work prepares children for adding and subtracting with whole numbers without counting on and back on a number line.

Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

Children get a visual and tactile experience of number bonds both in play and in taught activities with Numicon apparatus. Children regularly explore compositions to 10, talking with their friends and with adults about what they are doing. This multi-sensory experience makes their learning memorable, and supports them as they start to recall adding, subtracting and doubles facts automatically.

New Numerical Patterns Early Learning Goals

Children are expected to:

Verbally count beyond 20, recognising the pattern of the counting system

Numicon Firm Foundations provides Daily Counting activities to help children realise that we count when we need to know 'how many'. Children extend their verbal counting range beyond 20, learn to see patterns in the sequence of number names and learn to count objects accurately to 20 and beyond. All this counting is supported by the structured images on the Numicon number lines.



Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity

In *Numicon Firm Foundations*, children initially explore the Numicon Shapes and build their patterns, before moving on to learn the cardinal value of numbers 1–10 and beyond. They learn how to compare sets of objects by counting and by arranging objects into Numicon patterns to find 'how many more' and 'how many fewer'. From here they can develop the vocabulary of adding and subtracting.

Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally

The *Numicon Firm Foundations* teaching programme and the structured apparatus are designed to help children notice numerical patterns and describe relationships between numbers. They learn to answer questions such as, 'is it big or small?', 'odd or even?', 'which number comes before?', 'which comes after?' and 'what patterns can you see in the number?'. The Numicon Shapes lend themselves to learning about odd and even numbers in a visual and tactile way. Later in the programme, children use the confident understanding of number they have gained to halve collections and share them equally.

Other new Early Learning Goals supported by the Numicon teaching programme

The Numicon approach to teaching uses imagery and action, along with the Numicon structured apparatus, to support children and teachers to communicate their ideas about mathematics. This approach provides many opportunities for you to assess other prime areas of learning in your classroom, particularly:

Communication and Language

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

- 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

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

- 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.

In the *Numicon Firm Foundations* Activity Cards, you will also find activities that relate to Early Learning Goals from other parts of the curriculum, such as Expressive Arts and Design, Understanding the World, and Physical Development. These activities give opportunities to enhance children's mathematical vocabulary and understanding and for them to see mathematics used in lots of different contexts. As a whole, the *Numicon Firm Foundations* programme not only covers the ELGs for mathematics, but provides plenty of opportunity for your class to explore many aspects of the EYFS curriculum.

Coverage chart

Use this chart to see which Activity Cards best match each of the six Early Learning Goals for mathematics.

How Numicon Firm Foundations supports the Early Learning Goals

Early Learning Goal	Numicon Firm Foundations Activity Card	Comments
Number		
Children at the expected level of development will: Have a deep understanding of number to 10, including the composition of each number;	Meeting and exploring Numicon Shapes and number rods. Matching, naming by colour, ordering, attaching number names and numerals. Learning to build Numicon Shape patterns for each number. Introducing Numicon Shapes AC1 Introducing number rods and ordering Numicon Shapes AC2 Introducing Numicon Shape patterns and number rod trays AC3 Linking Numicon Shapes with numbers and numerals, and comparing number rods AC4 Securing links between numerals, Numicon Shapes and patterns, and ordering number rods AC5	ACs 1–5 are essential learning for all children, as these enable children to construct meaning for the Numicon Shapes and number rods. They provide the first steps towards understanding number to 10. Children will develop deep understanding through the activities on the remaining ACs.
- Subitise (recognise quantities without counting) up to 5; - Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.	Daily maths opportunities AC A Daily counting activities AC B Introducing Numicon Shape patterns and number rod trays AC3 Linking Numicon Shapes with numbers and numerals, and comparing number rods AC4 Securing links between numerals, Numicon Shapes and patterns, and ordering number rods AC5 Adding with Numicon Shapes AC8 Adding one more AC9 Taking away with Numicon Shapes AC10 Subtracting one and adding one with number rods AC11 Halving and sharing AC12 Adding – parts and wholes AC13	Building Numicon Shape patterns ACs A and B, ACs 3–5 Children will need plenty of practice doing practical adding and subtracting with the Numicon apparatus if they are to begin to remember some adding and subtracting facts. Teachers will hear children saying some recalled facts as they work on the practical activities on Activity Cards.

Early Learning Goal	Numicon Firm Foundations Activity Card	Comments
Numerical Patterns		
Children at the expected level of development will: Verbally count beyond 20, recognising the pattern of the counting system;	Counting out loud ACs A and B Counting 1–10 ACs A and B Building Numicon Shape patterns ACs A and B, ACs 3–5 and onwards Recognising how many from Numicon Shape patterns up to 10 ACs 3–5 Numicon Shape patterns up to 20 ACs 6 and 7	In these activities, children connect their growing ability to recite the count sequence and their familiarity with Numicon apparatus to learn the cardinal value of numbers and talk about relationships between them.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;	Counting out loud ACs A and B Counting 1–10 ACs A and B Building Numicon Shape patterns ACs A and B, ACs 3–5 and onwards Recognising how many from Numicon Shape patterns up to 10 ACs 3–5 Numicon Shape patterns up to 20 ACs 6 and 7	As children learn to recognise Numicon Shape patterns, they are able to use these to find out 'how many' by arranging objects into Numicon Shape patterns without counting in ones. This lays a firm foundation for an understanding of place value to be developed in Key Stage 1. Understanding the structure of higher numbers is the cornerstone of their ongoing calculating.
Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	To check that children use the terms 'odd' and 'even', build them into your teaching of ACs 4 and 5. Other opportunities will crop up throughout all the ACs. Explore and represent (Numicon) patterns within numbers up to 10 ACs 7 and 8 and beyond. Halving and sharing including distributing quantities equally AC12 Halving and doubling AC16	The Numicon Shapes lend themselves to learning about odd and even numbers in a meaningful way. Later in the programme, children use their confident understanding of number to halve collections and share them equally.

How to use the Numicon Firm Foundations Activity Cards

The Activity Cards help you explore the Early Years Foundation Stage mathematics curriculum in all areas of your classroom. Work through the Activity Cards in the order shown on the 'How Numicon Firm Foundations supports the Early Learning Goals' coverage chart to help children achieve the EYFS Early Learning Goals 2020. You should plan to spend around two weeks on each card.

Before you start, organise your classroom so that it is rich in mathematics and number images. This will support children's learning throughout the programme. Refer to the Firm Foundations Teaching Guide from page 9 onwards for examples on how to do this. You can also find [display ideas and templates](#) on the Oxford Owl website.

Use the **Activity Cards** in the order shown on the Early Learning Goals coverage chart. Keep learning simmering throughout the year with Daily counting and Daily maths activities from Activity Cards A and B.

Model **mathematical vocabulary** and listen for children using it as they meet the new ideas on each card and show their thinking with the help of the Numicon apparatus.

Use the **Learning opportunities** to support your planning. These break down the key ideas into small steps. The Mathematics Early Learning Goals require children to build essential number understanding; these steps help them get there.

Children's actions and vocabulary offer great **assessment opportunities**. What children say and do provide insight into what they have understood and help you see where further support is needed.

The **title** shows the new mathematics ideas children will be learning about in this Activity Group.

The **introductory text** explains how these activities fit into the development of children's understanding of number. It includes some teaching guidance and watchpoints for assessment.

Every card provides creative **Shape, Space and Measures** activities interwoven with the number content. These help children to explore and share their ideas about a specific aspect of Shape, Space and Measures.

Adding one more

Activity Group 9



Children continue to explore adding in this activity group, focusing on adding one more in practical, everyday situations and stories. They are encouraged to make connections between their counting and the increase in cardinal number values illustrated by the pattern made when Numicon Shapes are arranged in order. This helps children to make the generalization essential to understanding our number system: adding one to any number will equal the next number, that is, the successor relation.

Continue to model number stories for children often, illustrating with Numicon Shapes. Gradually extend from using everyday words to using mathematical language in your stories, e.g. from 'makes' to 'equals', and from 'and' to 'add'. Children's own adding number stories will reveal their understanding and whether they have assimilated this new language. In the rod activities children now give rods number names.

Shape, space and measures focus: money
Children begin to explore money through activities such as sorting coins and shop role play. They begin to experience shopping as an exchange transaction.

Key mathematical ideas
Before teaching this activity group, refer to the Key mathematical ideas in the Teaching Guide:
Contrasting, comparing and combining, Equivalence, Order, sequences and direction, One-to-one correspondence, The successor relation, Counting, Not-counting, Adding, Measuring, Reasoning and logic.

Communicating
Use the following words and terms and listen for children using them:
number names (one, two, three, ...), how many?, add, one more, add one, add more, altogether, equals, as many as, the same number as, next, sort, set, money, coin, pence, pay, change

Learning opportunities

- To relate finding one more to a number line and to notice that when one is added to any number the result is the next number.
- To add one and find one more using Numicon Shapes and Shape patterns.
- To understand that adding involves increase and to use the language of adding.
- To find one more than a given number, starting with 1–9 and extending to 19.
- To solve 'one more' problems and make up 'one more' stories.
- To give number names to rods.
- To recognize coins and sort them in different ways.
- To use everyday language to talk about money.
- To begin to appreciate that shopping involves exchange.

Assessment opportunities
Look and listen for children who:

- Show understanding of the words and terms for communicating in what they say and do.
- Use structured apparatus to communicate their ideas.
- Continue to work in a systematic way once they have been shown how to begin.
- Add one to each number to 9 (then to 19).
- Make a general statement when they have noticed something that always happens, e.g. when one is added to any number the answer is always the next number.
- Tell an increase story and illustrate by adding more with objects or Numicon Shapes.
- Use number names for rods.
- Recognize coins.

Read the **Key mathematical ideas** to understand what challenging ideas children will meet and to spot potential difficulties. As you 'walk in their shoes', you will notice when children make small but significant steps towards understanding.

The **Daily maths opportunities** suggest daily routines incorporating number, so children can see and use mathematics throughout the day. Try them at registration, or during transition times, indoor and outdoor play, and working time.

By **counting regularly** in real-life contexts, children learn that we count to find 'how many' and that accuracy is important. Over time, children extend their counting range and notice patterns in the number names.

Using mathematical language should become part of your classroom culture, adopted by teachers and supporting adults alike. This means children will hear mathematical language again and again in different situations.

Whole class mathematics activities use key mathematical words and terms, modelled by action with Numicon Shapes and number rods. Use a magnetic board or [Numicon Software for the Interactive Whiteboard](#).

Activities with structured apparatus are the core of Numicon. Teach these multi-sensory activities in small groups so children can handle the apparatus. Later, they will repeat the activities with friends.

All doing maths together

- Select from the activities suggested in:
- Activity Group A: Daily maths opportunities
 - Activity Group B: Daily counting activities

Also:

- Model adding a 1-shape to each Numicon Shape, 1–10, in order (as in Activity 1).
- Ask children 'one more' questions using the Display Number Line.
- Show Numicon Shapes for children to say the Shape that is 'one more', and check by adding a 1-shape.
- Model a 'one more' activity. Have a container of small-world creatures. Give two children a large leaf each. Invite them each to take the same number of creatures (1–6 to begin with) and place them on their leaf. Discuss the fact that there is an equal number of creatures on each leaf. Then say:

How many would you have if you had one more?

Let each child take another creature and group their creatures into a Numicon Shape pattern to show how many they have now.

- Continue to illustrate 'adding more than one' stories with Numicon Shapes, e.g. show a 6-shape and add a 2-shape as you say:

There were six children on the climbing frame. Then two more children joined them. How many children were there altogether?

Encourage children to make up their own 'adding more' stories.

- Show rods 1–10 in order. Point to the white and then the red rod. Say:

If this is 'one', what shall we call this?

Agree the red rod is 'two'. Repeat for the remaining rods.

Variation: work back from the 10-rod. Increased challenge: show rods one at a time for children to name.

- Sort coins with children, e.g. on the Interactive Whiteboard.

Activities with structured apparatus

Activity 1 Finding one more with Numicon Shapes

Have ready: Numicon Shapes, Numeral Cards 1–10 (cut from photocopy master 2)

Show Shapes 1–10 in order and labelled with Numeral Cards. Place an extra 1-shape beside the 1-shape to make the 2-shape pattern. Say:

What have I done?

Model the related sentence:

One add (and) one makes (equals) two.

Work with children to repeat for the other Shapes, in turn, adding an extra 1-shape to each to make the Shape pattern for the next number. Encourage children to describe what has been done each time.

Increased challenge: continue adding to 20; ask children to 'add one' to any number in their counting range.

Activity 2 Finding one more – game

Have ready: Numicon Shapes, Numeral Cards 1–10 (cut from photocopy master 2), Numicon Spinners with 1–5 and 6–10 Spinner Overlays (cut from photocopy master 6)

Show Shapes 1–10 in order, labelled with numerals. Children spin a numeral, say the number and find the matching Shape. They say the number that is 'one more', and point to the matching Shape and numeral. Children can use a 1-shape to help them, until they can identify 'one more' without it.

Activity 3 Finding one more with numerals

Have ready: Numeral Cards 1–9 (cut from photocopy master 2), Numicon Display Number Line or Large Format Table-top Number Line

Put the shuffled Numeral Cards face down in a pile. Children take turns to turn over a Card and say the number that is 'one more'. They find both numbers on the Number Line.

Talk about the positions of the numbers and the relationship between them.

Increased challenge: can children explain what happens when one is added to any number?

Activity 4 Naming rods as numbers

Have ready: Numicon Number Rod 1–10 Trays, number rods

Children choose a Tray and build a rod 'staircase', beginning with the white 1-rod. Once the pattern is complete, they point to each rod in turn and say the number name.

Discuss the increase that children notice in the ascending pattern.

Variation: invite children to build the rod staircase on the tabletop and use a small-world figure to 'climb' the stairs as they say the number names.



Ask **encouraging questions** to invite children to explain their ideas. Using the Numicon apparatus helps children to learn and remember adding and subtracting number facts.

Numicon apparatus gives children insight into number ideas that they cannot see just from numerals or collections of counters.

Children develop **fluency and understanding** as they hear and answer questions in conversations with their teachers and other adults.

The learning focus of the Activity Card is followed through all parts of the class, both indoors and outside, so children experience how we all **use mathematics every day** in many aspects of our lives.

Adults have an important part to play in setting up the carefully chosen **outdoor mathematics and physical play activities**. Take care to model specific language and listen for children incorporating it into their conversations.

Hear what children say and notice what they do in **sand, water and messy play**. You will get insight into their thinking, and know when to move children on to increased challenges for even deeper understanding.

Learning to **recognise patterns** and predict from them is fundamental to mathematics. Children have a strong sense of pattern and will enjoy engaging in the expressive art and design activities suggested on each Activity Card.

Including Numicon apparatus and patterns in all parts of the setting creates an **inviting and exciting environment** that allows children to notice, informally, number relationships and talk about them.

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Exploring maths all around us

Outdoor maths and physical play

- Give each of 10 children one of the Large Foam Numicon Shapes to hold. Ask them to run, skip, hop or jump, then, on a signal, to stop and organize themselves into a number line. **1**

The child with the 1-shape then moves along the line adding their 1-shape to each of the others, in turn, to make the Shape patterns of the numbers that are 'one more' in each case.

Talk with children about what they see happening.

How will you say the number sentence?
Two and (add) one makes (equals) three.

You can also support children by chalking numerals 1–10, in order, on the ground.

Increased challenge: in pairs, children take turns to roll a pocket dice showing Numicon Shapes 1–6 (inserts available on the Oxford Owl website) and arrange large counters into the Numicon Shape pattern for the number rolled. The second child adds one more counter to the Shape pattern, says the new number and finds it on a number line.

Sand, water and messy play

- Children make impressions with Numicon Shapes in wet sand or modelling dough. Encourage them to use the 1-shape to add 'one more' to their impression. Encourage them to say the number sentence, e.g.

Four and one more makes (equals) five altogether.
What number are you adding one more to?

Increased challenge: children use small toys or natural objects to make a Shape pattern, then add one more and find the total on a number line. **3**

Expressive arts and design

- Provide a variety of stamps in different shapes, made from, e.g. sponges, potatoes. Invite children to print with these, to decorate, e.g. signs for a role-play shop (see Role play, small-world-and-construction).

Children can count how many prints they make as they go. **3**

How many prints will there be if you make one more?

- Create opportunities for counting in songs and music.
- Provide a wide variety of instruments for children to explore. Encourage them to share the instruments fairly within groups of different sizes.
- Encourage children to create 'one more' verses for simple action songs.







Gentle questioning encourages everyone to talk about their ideas, from reticent children to more confident speakers. You will notice children moving on from using simple everyday language to using more specific and sophisticated words and terms.

As children create **repeating patterns** they learn to work systematically to predict the next shape or colour. You can use their creations in displays and during discussion.

In **music activities** children create sound patterns with percussion instruments. They learn number songs, with repetitive structures, like those in *Numicon at the Seaside*. Assess understanding by asking children to add their own verses.

A **selection of activities** should be available every day so children can explore mathematical ideas independently with their friends. Change the choice of activities every couple of days and include activities from previous Activity Cards.

Make each child a **Numicon Counting and Number Ideas Book** using the template on Oxford Owl. On each page, children explore a different number, adding their own patterns and drawings.

Children naturally use mathematical ideas and language as they count, share and arrange **small world play** equipment. Sometimes they are encouraged to arrange small world characters into repeating patterns or group them into sets.

Stories, songs and rhymes let children explore mathematics in a fun and creative way, while learning mathematical language. Numicon at the Seaside has a song for each number to ten, plus activities to try at home.

Help with counting fluency by **counting objects frequently**. By placing objects on number lines, then arranging them into Numicon patterns, children recognise each number's cardinal value, composition, and place in the number system.

Activity Group **9**

- Games, puzzles and tabletop**
 - Provide counting objects, e.g. counters, buttons, small toys, shells. Ask children to use Numicon Dice or Spinners with 1–5 and 6–10 Spinner Overlays (cut from photocopy master 6) to roll or spin a number, and to use counting objects to make the number as a Numicon Shape pattern. They add one more object to make the Shape pattern for the next number, and find it on a number line. **9**
 - Give children mixed collections of coins. Encourage them to find the numerals on the coins, and to sort them into sets of 'copper' and 'silver', then into sets of coins that are the same.
 - Provide large card coins for children to recognize, name and match with small coins.

What coins can you name?

 - Invite children to make rubbings of different coins using crayons or pencils.
 - Ask children to work on the next number in their counting and number ideas book. **10**
- Stories, songs and rhymes**
 - Share number rhymes involving amounts of money in pence. Encourage children to link buying one more with adding one, reinforcing this by illustrating with Numicon Shapes and a number line.
 - Share stories and rhymes involving 'one more' or 'add one', illustrating with Numicon Shapes and a number line.
 - Numicon at the Seaside includes several songs involving 'one more'.

How many trains are there?
There is one more train coming through the tunnel. How many are there now?
- Other curriculum links**
 - Understanding the world – People and communities:**
 - Role playing shops, reflecting diverse occupations and ways of life.
 - Understanding the world – Technology:**
 - Sorting coins using the Numicon Software for the Interactive Whiteboard. **12**
- Role play, small world and construction**
 - Set up role-play shops, e.g. a garage, a market stall, a shoe or clothes shop, a sports shop, with real coins for children to use. Encourage children to swap roles – customer and shopkeeper – so they experience playing at paying and giving change.
 - You could set up a 'games' shop with, e.g. balls, bats, hoops and skipping ropes in different sizes for children to 'buy' and then play with, giving them opportunities to use the language of size. **11**

Which size of hoop would you like to buy?

Every fortnight, children **explore a focus number** in depth. This focus reinforces the link between the numeral, its place on the number line, and its related Numicon Shape and number rod.

While these **other curriculum links** relate to the previous Early Learning Goals, they will also relate to the new goals, particularly Understanding the World: People, Culture and Communities, the Natural World.

Suggestions for **using technology**, such as an interactive whiteboard, or a camera, are made on each Activity Card. Children also enjoy using the **Numicon Software for the Interactive Whiteboard** on Numicon Online in class.

Written by Rosemary Sawtell and Rachel Hussain © Oxford University Press 2020

How to get in touch:

web: www.oxfordprimary.co.uk
email: schools.enquiries.uk@oup.com
tel: +44 (0) 1536 452610

Professional Development:

email: primary.training.uk@oup.com
tel: +44 (0) 1865 353735