Giving you confidence at a time of curriculum change

Discover a proven approach for teaching maths, loved by children and teachers
Build a secure future in maths with Numicon

- Proven pedagogy raises achievement across all ability levels and sustains it over time.
- Supported by bespoke professional development that will support and inspire you to deliver the highest quality teaching.
- And now new resources for Geometry, Measurement and Statistics mean you can use this tried and tested resource to teach across the maths curriculum from Spring 2014.

5 reasons why Numicon is ideal for teaching the new maths curriculum

With problem-solving, reasoning and conversation at its heart, Numicon perfectly embodies the aims of the new national curriculum:

- Develops fluency by using a visual, practical base to develop conceptual understanding and fluent recall.
- Helps children to reason mathematically by encouraging them to notice relationships and make generalizations through the use of concrete objects.
- Develops children into confident problem-solvers, using real-life contexts that give every activity a purpose.
- Encourages every opportunity to use spoken language to explain, justify and reason.
- New resources for Geometry, Measurement and Statistics, along with those for Number, Pattern and Calculating, mean you can teach right across the maths curriculum with Numicon.

The Numicon Curriculum Promise

Begin your preparations now with the reassurance that Numicon delivers the needs of the new Programme of Study. We provide all the support that you need, with a promise that if you purchase Number, Pattern and Calculating 1 to 3 Activity Handbooks and Teaching Guides before Spring 2014, you will receive new editions free of charge on publication.

Receive extra help to prepare for the curriculum change when you sign up for the Numicon Works e-alert:

- Be part of the Numicon community and get access to regular news updates and free activities.
- Be first to hear about our national events, NCETM-accredited Professional Development, new resources and additions to Numicon from Spring 2014.
# Numicon Overview Chart

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Resources currently in development for all elements of Numicon for Y5 and Y6 (age 9-11)

Also available:
- Numicon Closing the Gap
- Investigations with Numicon Teaching Guide
- 1st Steps with Numicon at Home
- 1st Steps with Numicon in the Nursery Kit

Also available! Working with Numicon Training DVD and Interactive Whiteboard Software

Firm Foundations also available!
Number, Pattern and Calculating 2, Teaching Resource Handbook - Sample Activity Group

Key mathematical ideas: Counting, Pattern, Place value, Equivalence, Order, Mathematical thinking.

2-digit numbers

Focus activities

Activity 1: Hearing, writing and building 2-digit numbers to 30
Have ready: Numicon Shapes, Numicon 0–100 Number Cards, Numicon 0–100 cm Number Line, Numicon Coloured Pegs, number rods, counters and small objects, Numicon Software for the interactive Whiteboard (optional)
Step 1
Set the scene by asking children to find different ways to describe or name themselves, e.g. ‘My name is Grace’, ‘I am six years old’, ‘I am Ben’s younger sister’.
Step 2
Now say to children, ‘Numbers are just like us. There are lots of ways we can describe a number’. Ask children to find ways to describe ‘twenty-three’ (just say the number name to children).
Step 3
Discuss all children’s ideas and display the written numeral ‘23’, the words ‘twenty-three’, Shapes for 23, number rods for 23, 33 objects arranged or drawn in Numicon Patterns, 23 in tens, 23 circled on the 0–100 cm Number Line, the words ‘two tens and three ones’ and any other ideas children may have to use in 5
Step 4
Choose another number in the range 20–30 and encourage children to try a different representation from the one they tried before. Continue until you are confident that children can communicate the 2-digit numbers 20–30 in many different ways. Include use of the independent practice that accompanies this activity.

Activity 2: Numicon Shape Bingo (or number rod Bingo) – building, writing and hearing 2-digit numbers
Have ready: Numicon Shapes, small pieces of paper (approximately 6 cm x 4 cm), a box or basket, number rods
Step 1
Give each child three small pieces of paper. Select a number range appropriate for your children and the number of Shapes available. Ask each child to build three different 2-digit numbers with Shapes and space them out clearly on their tabletop. Children check with their partners that they have each built the 2-digit numbers correctly.
Step 2
Give children who are ready for a more advanced challenge the numeral for their numbers on separate pieces of paper and put them in the box or basket.
Step 3
A teacher takes a piece of paper from the box or basket and reads the number aloud. Anyone with that number removes their Shapes from their tabletop. The winner is the first to remove all of their Shapes.
Step 4
Play the game again with number rods.
Step 5
Vary by giving children six pieces of paper. Ask them to choose three different 2-digit numbers and to write each number twice. One copy goes in the box or basket and the other on their tabletop. The caller takes a piece of paper from the box and, instead of calling the number, builds it with Shapes or rods and writes the number words. The children all name the number that the caller has built or read the words aloud and any child who has the matching numeral tosses it over. The winner is the first to turn over all of their numbers.

Sample

Numbers and the Number System

2 tens and 3 ones

Focus activities are supported by clear illustrations.

New Edition for Spring 2014

Clear list of the concrete objects used to support learning is provided at the start of every focus activity.

A clear outline of the content covered in the activity group and how that connects with other activity groups.

Extensively trialled with teachers and children, all activity groups come from real classroom experience.

Important words and terms are highlighted for use in mathematical conversation.

Progress Books are an invaluable assessment tool and provide a record of children’s achievement.

Clear assessment opportunities for every activity group.

Educational context

The activities in this group begin by consolidating work with 2-digit numbers from 20 to 30. Children need to be confident about the pattern in the number names to 30 and then use their knowledge to make generalizations about number names to 100. The activities include naming, labelling and building 2-digit numbers with Numicon Shapes and number rods, and involve exploring relationships between the numbers so that children can extend their understanding of the number system and number line representation. Children have already used the term ‘tens and ones’ to describe the structure of 2-digit numbers; they now continue to develop their understanding of place value and the equivalence between quantity value and column value (e.g. the quantity value of the ‘2’ in 20 is ‘20’ and its column value is ‘2 tens’). The Numicon Shapes and number rods illustrate this distinction very clearly, enabling children to see the size of the number as well as its structure of tens and ones. In this activity group, children start to use the term ‘multiples of 10’ for the numbers they have previously called ‘tens numbers’.

Assessment opportunities

Look and listen for children who:
• Use the words and terms for use in conversation effectively in discussion.
• Make the common error of describing 2-digit numbers as, e.g. ‘two and eight’ or ‘twenty and eight’. Correct this by reminding them of the imagery of Numicon Shapes or number rods showing what the 2 represents and modelling the phrases ‘two tens and eight ones’ or ‘twenty and eight’.
• Can build 2-digit numbers with Numicon Shapes when they hear the number name or see the numerals written.
• Can read 2-digit number names from numerals.
• Can write numbers for 2-digit numbers when they hear the number name.
• Can say and write the 2-digit number name from seeing it built with Numicon Shapes or number rods.
• Can say how many ‘tens’ there are in a 2-digit number.
• Can describe the column values of 2-digit numbers, e.g. ‘tens’ and ‘ones’ for 25.
• Understand the equivalence between quantity and column value.
• Understand the structure of multiples of 10.

After completing work on this activity group, give children the chance to work on their Explore Progress Book.

After completing work on this activity group, give children the chance to work on their Explore Progress Book.

Important words and terms are highlighted for use in mathematical conversation.
New Edition for Spring 2014

Focus activities are broken into easy-to-follow steps that can be easily adapted to suit the needs of the class.

Focus activities give children multiple opportunities to build the understanding necessary to develop their fluency.

Number, Pattern and Calculating 2, Teaching Resource Handbook - Sample Activity Group (continued)

Activity 3: Finding numbers on the Numicon 0–100 cm Number Line and the Numicon 1–100 cm Number Rod Track

Have ready: Numicon 0–100 cm Number Line, Numicon 1–100 cm Number Rod Track, number rods, Numicon Software for the Interactive Whiteboard (optional).

Step 1
Ask children to build a 2-digit number, e.g. 47, using number rods (see Fig. 3). Choose either the 0–100 cm Number Line or the Number Rod Track and find the number they think the rods will reach. They check by placing rods end-to-end along their 0–100 cm Number Line or Number Rod Track. Discuss and agree that the number in both cases is, e.g. 47.

Step 2
Repeat for other numbers, giving children the chance to use both the 0–100 cm Number Line and the Number Rod Track. Look and listen for children who can find and show numbers on both.

Activity 4: Using the Numicon 10s Number Line and the Numicon 1–100 cm Number Rod Track to compare numbers

Have ready: Numicon 10s Number Line, Numicon 1–100 cm Number Rod Track, Numicon Shapes, Numicon 0–100 cm Number Line, Numicon Coloured Pegs or adhesive back mortar, Numicon Rods, Numicon Software for the Interactive Whiteboard (optional).

Step 1
Turn over a Numeral Card from the pack, e.g. 37, and ask children to read the 2-digit number and ask them to build it using Shapes (e.g. 3 rows of 7 and rods 0 + 7). Ask them to decide which one they would like to have. Listen for those who realize that, in terms of monetary value, there is no difference, the bags are equal. (Children may have other reasons for why they might prefer one bag or the other.)

Group the 1p coins into two Numicon 10-patterns to check.

Step 2
Ask children to show the equivalence using Shapes or rods. Look for children who place Shapes or rods on top or alongside each other, showing that, e.g. 2 two-shapes are equivalent to one 10-shape. Some children might suggest using the Pan Balance.

Step 3
Hold up two 10-shapes or two 10-rods and ask children what they would write to show this number. Discuss all their ideas, which might include: ‘2 tens’, ‘two tens’, ‘ten’, ‘20’, ‘twenty’, ‘20’, ‘10’, ‘10’.

Activity 5: Quantity value and column value using coins

Have ready: Numicon 10s shapes and 1-shapes, 10p and 1p roods, a bag containing 10p coins, a bag containing twenty 1p coins, Numicon Pan Balance (optional), Numicon Software for the Interactive Whiteboard (optional). Explore More Copymaster 10: Saving Pennies.

Step 1
Show children the two bags. Explain that one bag holds two 10p coins and the other bag holds twenty 1p coins. Ask them to decide which one they would like to have. Listen for those who realize that, in terms of monetary value, there is no difference, the bags are equal. (Children may have other reasons for why they might prefer one bag or the other.)

Group the 1p coins into two Numicon 10-patterns to check.

Step 2
Ask children to show the equivalence using Shapes or rods. Look for children who place Shapes or rods on top or alongside each other, showing that, e.g. 2 two-shapes are equivalent to one 10-shape. Some children might suggest using the Pan Balance.

Step 3
Hold up two 10-shapes or two 10-rods and ask children what they would write to show this number. Discuss all their ideas, which might include: ‘2 tens’, ‘two tens’, ‘ten’, ‘20’, ‘twenty’, ‘20’, ‘10’, ‘10’.

Activity 6: Multiples of 10

Have ready: Numicon 10-shapes, Numicon 0–100 cm Number Line, Numicon 10s Number Line, Numicon 1–100 cm Number Rod Track, number rods, Numicon Software for the Interactive Whiteboard (optional).

Step 1
Show children three 10-shapes. Ask them to name the number and to say how many tens and how many ones equal 30. Model writing ‘3 tens = 30 ones’.

Step 2
Try other examples e.g. more than discuss with children what is similar about each number. Look and listen for children who notice that the use of 2-digit numbers, each number has been made using only 10-shapes so the first numeral tells us how many tens and that the last numeral is always zero because there are no ‘ones’.

Step 3
Introduce the word ‘multiple’ by explaining to children that when they were younger they called these numbers ‘tens numbers’, but now they are going to call them ‘multiples of ten’, because this is a more grown-up mathematical term. Encourage children to use the structure of the numbers, the written word endings and the difference between the ‘teen’ and ‘ty’ sounds.

Step 4
Look at the written words on the 10s Number Line and ask children what they notice. Agree that from twenty to ninety all the words end in ‘ty’. Discuss the difference between these numbers and the ‘teen’ numbers. Encourage children to compare the structure of the numbers, the written word endings and the difference between the ‘teen’ and ‘ty’ sounds.

Step 5
Repeat with rods. You could begin with a number, e.g. 30 and check that it is a multiple of 10 when it is built with rods along the Numeral Rod Track (see Fig. 7).

Step 6
Ask children to draw their own empty number line and then mark the multiples of 10 and write the number words, e.g. Fig. 8. Discuss with children about the importance of having roughly equal spaces between the points marked.
Activity 7: Knowing the column and quantity values of each digit in a 2-digit number

Have ready: Numicon Shapes, Numicon (Feely Bag) with four 10-shapes and a 6-shape, Numicon 0–100 Number Line, number rods, Numicon Software for the Interactive Whiteboard (optional)

Step 1
Ask children to feel in the Feely Bag and say how many 10-shapes they can find. Now ask if there are any other Shapes. When they have found the 6-shape, ask if they can say what number is in the Feely Bag. Take the Shapes out, check and find 46 on the 0–100 Number Line (e.g. 26, 46).

Step 2
Look at the 46 made with Shapes and ask children to describe what they can see. Look and listen for children saying ‘four ten-shapes and a six-shape’ and for others who say ‘forty-six’.

Step 3
How build 46 with rods, agreeing with children that six 1-rod counters can be used instead of the six-shape. Then discuss and agree that, as with the Shapes, we can see that 46 has 4 tens and 6 ones. 46

Step 4
Ask children to write the numeral for 46. Discuss what each of the digits represents. Look for children who understand that the 4 means 4 tens which is 40 and the 6 relates to the 6 ones.

Step 5
By some other examples.

Whole-class
- Make a display of 2-digit numbers. Invite children by asking them to bring in pictures, photographs or notes they have made of 2-digit numbers at home and in school.
- Hold up (or use the Numicon Software for the interactive Whiteboard) to show different amounts of Numicon 10-shapes for children to say the total quantity value. Then ask, “how many tens?” Ask children how they can be sure that, e.g. the 2 tens equal 20, since they are using two different names to describe the same Shapes. Look and listen for children who refer to, e.g. the two 10-shapes having 20 holes.
- Hold up (or use the Numicon Software for the interactive Whiteboard) to show number rods for different 2-digit numbers to help them say the total quantity value. Then ask, “how many rods?” and “how many ones?” Find the numbers on the Numicon 0–100 cm Number Line.
- Hold up (or use the Numicon Software for the interactive Whiteboard) to show Numicon Shapes or number rods individually to large numbers. Ask children to write the numbers and place them on the Numicon 0–100 cm Number Line.

Number Line
- Edition to children that you need to have, e.g. 27 stickers. Ask children to hold up that quantity using Numicon Shapes and number rods.
- Show children number words for them to read and then to hold up that quantity using Numicon Shapes and number rods.

Independent
Paired work for Activity 1
Have ready: Numicon Shapes, Numicon 20–30 Numeral Cards shuffled and face down, any Numicon Number Line, highlighter pen or Numicon Coloured Pegs or counters

Children take turns to turn over a 20–30 Numeral Card and build the number with Shapes. They mark each numeral on the number line as it is made and if spelling knowledge appropriate write the numeral words. Once all numbers from 20–30 have been built, children take the Numeral Cards and put them in order from 20–30.

Encouraging children to work together in practice activities gives valuable opportunities to engage in mathematical conversations.

Practice activities are included in every activity group to give children the opportunity to build on their knowledge.

Number, Pattern and Calculating 2, Teaching Resource Handbook - Sample Activity Group (continued)
Take turns to count out different amounts of coins in the second purse. Have they managed to out how much they have saved.

Practical, real-life contexts help make the maths relevant to children’s experiences.

Each activity has space for you to offer support and encouragement to children.

Assess children’s ability to use and apply their maths learning in new contexts.

Tasks presented to children in unfamiliar ways invite ‘non-routine’ problem solving.

Try to spot 2-digit numbers when out and about, e.g. on house numbers, road signs.

Ask your child to roll the dice and collect that amount of 1p coins.

Ask them to have another go to collect some coins in the second purse. Have they managed to save even more this time?

Ask them to have another go to collect some coins in the second purse. Have they managed to save even more this time?

Can you show Tom’s savings with other coins?

Give your child the Saving Pennies sheet.

Look at what your child can do.

Say numbers between 11 and 100 for your child.

How this will help your child

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Build numbers

Can you complete the picture for each of these numbers?

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Sample Activity Group
Number, Pattern and Calculating 4, Teaching Resource Handbook -
Numbers and the Number System

Introducing decimal fractions

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 by using place value cards.
• Compare and order decimal fractions.
• Round decimal fractions to the nearest whole number.

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. Decimal notation is supported children’s understanding and their ability to use decimal fractions in practical activities and in problem-solving situations. Children apply their knowledge of place value to compare and order decimal fractions.

Learning opportunities
• To understand that fractions sit 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 separates the whole and the parts of a mixed number.
• To use knowledge of place value to compare the column values 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

Focus activities
Activity 1: Introducing decimals through measuring

Have ready: metre sticks, objects to measure
Step 1
Ask children to measure one or two objects around the room with metre sticks. Talk about how many of those objects are exactly, e.g., 1, 2 or 3 metres long. Wait for children to explain that most objects they measure are not exactly the same length as the metre stick; they are 1, 2 or 3 metres, and a bit more or a bit less. Ask what we could do to measure those objects more accurately. Allow children to make suggestions and agree that we need smaller units.

Talk about different measuring situations, e.g., how long, how heavy, how much. Explain that these situations are very different from having a set of discrete, separate objects to count. Discuss with children how scales are marked with smaller and smaller divisions so that they can be used to describe continuous measures more accurately than, e.g., “2” and a bit.

Step 2
Look at the decimetre markings on a metre stick. Talk about the fraction of the metre stick that they represent. Agree that there are 10 sections on the stick so each section is 

Step 3
Measure the length of a table or height of a bookshelf with the metre stick. Record the length in whole metres and tenths of a metre, e.g., 1 m 2 dm. Say this as “one whole metre and two tenths of a metre.” Draw a number line on the board so children can connect the meaning activity and the number line. Mark by locating the whole numbers on the number line and then counting along in tenths, e.g., 1 m, 1.1 m, 1.2 m, etc. to identify the measurement.

Step 4
Give children plenty of opportunities to measure objects and locate numbers on the number line, as in Step 3.

Activity 2: Reading scales
Have ready: weighing scales, capacity vessels, Reading Scales (photocopy master 62)

Step 1
Talk with children about weighing scales and capacity vessels which have scales marked with intervals between the labelled amounts. Show them the scales on Reading Scales (photocopy master 62). Ask them to explain what the instruments with these scales measure and to make comparisons between the scales. Listen for children talking about intervals between each label on the scales and calling these units.

Step 2
Repeat Activity 1, but ask the children to measure the mass and capacity of objects and record those measurements in whole units and tenths (or a unit on a number line). Measurements can also be read from markers placed on the scales shown on Reading Scales (photocopy master 62).

Activity 3: Making connections with fractions on a number line

Step 1
Draw a 0–10 number line and mark and label the whole numbers. Ask children to identify any numbers that could be labelled on this line. If they identify 10 and 2 and 

Step 2
Ask children to place the number line on the whole numbers. Ask children if they know any more numbers that could be labelled on this line. If they identify them to think of it in between-point by relating the line to familiar contexts such as a 10-hour journey or a 10-kilogram weighing scale.

Step 3
Ask children to suggest mixed numbers like 1 2 or 1 3 for those who can explain where these could be positioned. Some children may have the idea that whole numbers are the only numbers. For these children, talk about in-between points until they agree that there are lots of numbers we could label between the whole numbers.

Step 4
Ask children to say a number that sits between any two consecutive whole numbers on the number line. Draw a number line from 2 to 3 and ask children to count on the line by moving to the next labelled point. Ask the child how they know they are responding to activities.

Explorer Progress Books offer a great opportunity to assess and monitor progress.

New learning is introduced through real-life scenarios. In this activity group, children start to learn about decimals through measuring.

Key mathematical ideas provide a summary of the important concepts.

Meaningful real-life contexts give children situations they can relate to.
Activity 4: Introducing decimal notation

Have ready: Place Value Frame – HTUTL (photocopy master 69), number rods, base-ten apparatus or interlocking cubes, Explore MORE Copymaster 14: MKK Round

Step 1
Remind children about the work they did with the number lines in Activity 3. Give one or two points on the number line for children to say a number in between, e.g. 3 and 4, 3.2 and 3.3 and 3.3. Also include much larger numbers, e.g. 51 and 52, 231 and 232.

Explain that there is another way to write in-between numbers using a decimal point. Refer to these as ‘decimal fractions’. Show children how to write decimal fractions using a point to separate the whole number and the tenths. Encourage them to notice that the decimal point separates the whole and the parts. Discuss how we read and say decimal fractions, e.g. 2.5 is written as 2 5 and said as ‘two point five’.

Introduce the term ‘common fraction’. Explain that this term to describe all the fractions children have learnt – proper and improper fractions and mixed numbers – whereas ‘decimal fractions’ describes fractions where the parts and wholes are separated by a decimal point.

Encourage children to understand that they can write the same number using decimal or fraction notation, e.g. 2.5 is the same as 2 1/2, just written differently.

Step 2
Work with children to write a few of the measurements made during Activities 1 and 2 as decimal fractions, e.g. 2 cm and 2.5 cm is written as 2 cm and 2 1/2 cm written as 2.5 cm. Encourage them to identify the whole unit and the parts of a unit each time.

Step 3
Show children the Place Value Frame – HTUTL (photocopy master 60), see Fig. 4. Make connections with previous place value work to help them understand that digits written in a particular place signify a particular value. Listen for children who can talk about the whole numbers as units or ones and encourage them to make links between the quantity values for each place so that they begin to explain that places to the left get 10 times bigger and places to the right get 10 times smaller each time. Encourage plenty of discussion about this, moving digits between places to explore the quantity values.

Concrete materials help illustrate children’s thinking and reasoning.

Activity 5: Using Numicon Shapes to support decimal notation

Have ready: Numicon Baseboard Laminates, Numicon 1 shapes, Numicon 1 shapes: Numeracy (pupil book), Decimal Grids (photocopy master 18)

Step 1
Show children the Decimal Baseboard and compare it to a Numicon 1 shape base 1. Ask children to imagine that the 1 shape has been put under a microscope or magnifying glass and magnified 10 times, making it 100 times bigger and allowing us to see that it is made up of 100 smaller parts. Talk with children about what we can see when we magnify other objects under a microscope and how this is useful in, e.g., medicine, science and technology.

Step 2
Place ten 1 shapes on the Decimal Baseboard. Ask children to imagine that here the Shapes are, like the Decimal Baseboard, under the microscope, and have been magnified. Ask that ten of these ‘small’ 1-shapes fill the Decimal Baseboard. Encourage children to name each shape as a fraction of the whole. It may help children to use the 10-shapes to represent packets of pencils or biscuits and talk about how many packets are in the whole box, allowing them to name each packet or Shape as a tenth.

Activity 6: Using decimal place value cards

Have ready: base-ten apparatus, Place Value Cards

Step 1
Show children base-ten 100-fillets and 10-sticks. Ask how we could use these to represent decimal numbers. Look and listen for children who compare the sizes and identify that 10-sticks make a 100-flat, so the 10-sticks could represent tenths.

Step 2
Give children a set of Place Value Cards. Ask them to make a decimal number with the cards, read it, and then make it with the apparatus. Listen for children who can read the decimal numbers and identify the column and quantity value of each part, e.g. 7.3 is 7 and 3 and 0.2. Look and listen for children who can make each number with base-ten apparatus in a different way.

Step 3
Ask children to repeat for other examples, before swapping the order to select the apparatus first and then make the number if represents with Place Value Cards.

Careful progression is built into every activity group, and across the whole teaching programme, helping children to become fluent through understanding.
Activity 7: Comparing decimal quantities

Have ready: Numicon Baseboards, Numicon 10-shapes (grey if available), Place Value Cards, base-ten apparatus or counting stick, photos of decimals appearing in everyday contexts, a variety of food nutrition labels.

Step 1
Ask children to think about the contexts and places in which they have seen decimal numbers used. Display photos of decimals studied in different everyday contexts and notice that some, e.g. money, have more than one digit after the decimal point. In this case, look and listen for children making the connection that the digit in the first decimal place represents tenths of the whole unit, e.g. the first decimal place when looking at a price such as £2.18 is worth 1 tenth of a pound, 0.1 pence.

Step 2
Collect some food nutrition labels, e.g. from packaging for, e.g. sandwiches, cereals, biscuits or drinks. Talk about what these labels show and why they are useful.

Step 3
Read with children the mass of protein, sugar, fat, carbohydrate or fibre in a serving. Encourage them to talk about the quantities in comparison with each other, e.g. ‘There is more protein than sugar in this food.’ Ask them what they need to know about decimal numbers to be able to say this. Look and listen for children who realise that they have to be able to order the amounts to say which is larger or smaller.

NUTRITION INFORMATION

<table>
<thead>
<tr>
<th>Typical values</th>
<th>per 40g serving*</th>
<th>per 100g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>237kcal</td>
<td>255kcal</td>
</tr>
<tr>
<td>Protein</td>
<td>7.14g</td>
<td>11.0g</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>33.4g</td>
<td>60.0g</td>
</tr>
<tr>
<td>Fat</td>
<td>6.78g</td>
<td>10.9g</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>2.89g</td>
<td>4.5g</td>
</tr>
<tr>
<td>Dietary fibre</td>
<td>1.64g</td>
<td>2.6g</td>
</tr>
<tr>
<td>Sodium</td>
<td>0.18g</td>
<td>trace</td>
</tr>
</tbody>
</table>

*whole milk

Step 4
Compare 2.3 and 2.8. Ask children to make these numbers with Place Value Cards and to make the decimal parts with 10-shapes on the Decimal Baseboard, explaining how they know which number is larger and which is smaller. Look and listen for children generalising that if the whole number is larger then the number is bigger, regardless of the decimal digit.

Step 5
Explore partitioning both numbers by separating the place value cards and naming the parts. 2 and 0.3, 3 and 0.2. Use the + and - signs to show the larger and smaller number. 2.3 < 3.2, 2.3 > 3.2. Make comparisons with whole numbers by asking children how they know that 32 is greater than 23.

Step 6
Repeat Step 6 with the numbers 2.3 and 2.6. Ask and listen for children who can justify why this time the whole number is the same, but 2.6 is the larger number or greater amount because it is more than 0.3.

Step 7
Repeat Step 6 with the numbers 2.3 and 2.6. Ask and listen for children who can justify why this time the whole number is the same, but 2.6 is the larger number or greater amount because it is more than 0.3.

Step 8
Look back at the nutrition labels. Ask children to come up with their own statements or questions about the nutrition information and use the ‘is greater than’ and ‘is less than’ symbols in their responses.

Activity 8: Ordering decimals in a list

Have ready: a variety of cereal boxes or food nutrition labels for breakfast cereals, blank cards, number line in 0-20 and 20-40 sections, adhesive tack or washing line and pegs.

Step 1
Provide children with a variety of cereal boxes or food nutrition labels for breakfast cereals. Ask them to look at the nutrition information and talk about what they notice, and whether anything surprises them. Look and listen for children making sense of the numbers and using comparative language to say that, e.g. a serving of one cereal contains more sugar than a serving of another.

Step 2
Ask children to write the name of each cereal and the amount of sugar in a serving on separate cards. Ask them to talk together to put these amounts in order. Look and listen for children quick to spot the smallest and largest numbers in the list and for those who work systematically through the list looking at the whole numbers and then the first decimal place.

Step 3
Display the cards in order, e.g. on a washing line or stuck on a board, to show the least to the greatest sugar content in a serving. Talk about what children have found out and why this information is useful.

Step 4
Give children a 0-40 number line and ask them to draw arrows to show the amount of sugar in a serving of each cereal.

Step 5
Once children understand how to order the position of decimal numbers on the number line, ask them to say which pair of whole numbers each amount of sugar is between, e.g. for Cereal A the amount of sugar is 14.8 g, which is between 14 and 15.

Step 6
Repeat this type of ordering activity for different contexts, e.g. distance or capacity measurements."
Number, Pattern and Calculating, Explorer Progress Book 4B - Sample Pages

New for Spring 2014

How Much Sugar?
Arrange these amounts of sugar along the number line.

What is the difference between the highest and lowest amounts? Can you explain how you worked this out?

Explorer Progress Books offer you opportunities to assess individual children and monitor progress.

Children have the freedom to record their answers in their own way, allowing you to see their thinking.

Tasks presented to children in unfamiliar ways invite ‘non-routine’ problem solving.

Open activities give you the opportunity to see how well children can use and apply.

Making Decimal Fractions
Can you choose 3 of these numeral cards to make a number between 15 and 20? How many different numbers can you find?

Can you put your numbers in order? Can you explain how you worked this out?

Number, Pattern and Calculating 4, Explore More Copymasters - Sample Pages

New for Spring 2014

Milk Round

What is to do:
1. Give your child the Milk Round sheet. Look at the school plan and the milk carton card boxes.
2. Explain that the cartons of milk are delivered in boxes and that 1 box holds 10 cartons. The box is the whole and the cartons are the parts. A carton is one tenth (1/10) of a available box.
3. Cut out the 2 box cards and the 9 carton cards.
4. Ask your child to look Class 1A on the plan and read the number amount (one point zero) e.g. 1.0 boxes.
5. Use a box card to show 1.0 boxes on the plan.
6. Show children how to use the class list and decimal fraction frame to show 1.0 boxes.
7. Explain the 1.0 box can be shown on the frame as 1 box and 0 cartons.
8. Ask your child to say the number out loud, e.g. 1 point zero.
9. Write down the number of children.
10. Use the frame to show 1.0 box and 0 cartons.
11. Ask your child the number of children for each class.
12. Read the decimal fraction and the number.

What to do:
1. Write in the class list the number of children for each class.
2. Use the fraction to explain how children can be organized.
3. Use the frame to show 1.0 box and 0 cartons.
4. Ask your child to explain how the decimal fraction and the number compare.

What is the difference between the highest and lowest amounts? Read the decimal fractions out loud.

New contexts make children think about how maths can be used and applied.

Activities for home offer further opportunities for children to explore maths in an engaging way.

Short, simple instructions guide parents through the activity.

Simple illustrations help to explain the purpose of activities.
Focus activities

Activity 1: Creating a timetable for today

Have ready: 44 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. 

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. 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. At 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: All 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 of the week and draw what order they came in and we can talk about what 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 came 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.

Activity 3: Sequencing months and birthdays

Have ready: Twelve shoe boxes with a hole in each and, large, 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. types of weather or typical activities 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.

Through creating their own tools for measuring, children gain deeper understanding of measuring constructs.

Focus activities are broken down into easy-to-follow steps that can be easily adapted to suit the needs of the class.

‘Low threshold, high ceiling’ activities allow you to differentiate for every child in your class through the same activity group.

‘Look and listen for…’ points help you to assess how children are responding to activities.

Clear assessment opportunities for every activity group.

Assessment opportunities
Look and listen for children who can:
• Use the words and terms for use in conversation effectively.
• Notice and order a whole day into a series of events and can talk about events using the correct vocabulary, e.g. before, after, later on, day and night.
• Notice the repetitive elements of days, e.g. getting up in the morning, eating breakfast, lunch, evening meal, going to bed.
• Understand that some days are different to others, e.g. weekdays and weekends.
• Recognize and use the days of the week in conversation.
• Recognize the month of the year and begin ordering them.
• Recognize a good time to use an analogue clock and be able to show a particular time using a digital clock.

Educational context

In this activity group children become aware of time duration, that some events take a long time and some are much shorter. Children have the opportunity to order personal events in a simple timeline and work towards seeing the timeline as a measuring instrument for their day.

Children become aware of how the day is divided into night, day, morning, afternoon and evening. They formalize their timeline into one consisting of twenty-four divisions called hours, and later these will be described as ‘o’clock. Children learn the names of the days of the week and the months of the year, and practice ordering them.

Children are introduced to an analogue clock and look at and explore its key features. They are guided through the early stages of telling the time to correctly identify, with or without a hand on a clock to show times thinking of ‘o’clock.

Learning opportunities
• To understand the passage of time given a day through creating a timetable.
• To set events in the day.
• To recognize events that stay the same each day and ones that change.
• To name and sequence days of the week and months of the year.
• To say if o’clock time is in the day, night, morning, afternoon or evening.
• To understand the terms ‘o’clock’ and to count around a clock in ‘o’clocks.’

Words and terms for use in conversation
early, late, day-time, night-time, morning, afternoon, evening, noon, midday, midnight, day, week, weekend, yesterday, today, tomorrow, month, year, date, clock, hour, o’clock, clockwise, turn

Progress Books provide a valuable opportunity to assess and monitor children’s achievements.

Key mathematical ideas provide a summary of the important concepts.

Meaningful real-life contexts introduced in the activities give children situations they can relate their maths learning to.

Extensively trialled with teachers and children, all activity groups come from real classroom experience.

Key mathematical ideas
Scales, Measuring instruments

Teaching Resource Handbook - Sample Activity Group
Geometry, Measurement and Statistics 1,
New for Spring 2014

Geometric Measurement and Statistics 1,
children, all activity situations in the activities give contexts introduced important concepts.

Summary of the Key mathematical introduction of mathematics introduced of mathematics introduced
Step 3
Ask children if anyone has a birthday soon. Ask children who do to come to the front and say when their birthday is. Discuss the dates and encourage children to think of how they calculate dates using the months of the year. Establish with children that they could make a class birthday chart.

Let children label each box with a month. Then ask children if they can help you make a birthday chart with all the months in the correct order. e.g. April. Encourage children to think of how they calculate dates using the months of the year. Establish with children that they could make a class birthday chart.

Activity 4: How do you know when it's time to...?
How many activities are there for children to complete during the day? How do you know when it’s time to go to bed, to go to school, get up, discuss their answers. Establish with children that there are clocks at various times of the day. Ask children if they can put the times in the correct order.

Step 2
Ask children what is a clock, and the language people use when they talk about clocks. If they mention ‘hours’ or ‘minutes’, explore their understanding further. Discuss what children understand about ‘hours’. Establish that the numbers on a clock represent hours. Ask children if they know how many hours there are? Look and listen for children who can count the numbers in the correct order. Explain that just as length can be measured with a ruler, time can be measured with a clock.

Establish with children that there are 12 hours marked on the clock.

Step 3
Talk with children about how a clock face is also a number line. Give tables of the hours, or children Numicon Shapes and ask them to make the numbers 1-12 and lay them out in a straight line. Ask children try to re-arrange the Shapes showing 12 to make a circle copying a clock face. This could be on a picture of a clock face for support (e.g. shape 1). Stick the Shapes onto paper in an circle. Look and listen for children who can order the Shapes correctly in the circle.

Step 4
Get 12 numbered cards 0-12 on the floor in a large circle like a clock face, place Numicon Shapes 1-12 next to each card for support. Stand a child in the centre and ask children to hold out their arms towards 12. Explain that their hands are just like the hands of a clock which points at the correct time. Talk about how we say ‘o’clock’ for each hour on the clock.

Ask the child to turn round (clockwise) and stop at 12. The other children have to say what time it is.

Ask children if they can put the times in a different order that makes sense to them. This could be on a picture of a clock face for support (e.g. shape 2).

Activity 5: Day and night-times
Have ready: 24 cards each saying an o’clock time on e.g. 3 o’clock or 5 o’clock, two strips of sugar paper each divided into 12 equally-spaced sections numbered 1-12, the events for the day pictures from Activity 1, labels of cards saying o’clock, ‘midnight’, ‘midday’, ‘afternoon’, ‘day’, ‘night’ and ‘morning’. Explore More Copymaster 8: Making a Timeline.

Step 1
Explain to children that the 12 hours on the clock show the time both during the day-time and the night-time, so that a whole day can be divided into two parts: with 12 hours in each. Give children the strips and explain that they will be making a timeline for the hours during both the day-time and the night-time. Ask children the labels saying ‘day’ and ‘night’ and ask children to place each of these at the top of a strip.

Step 2
Ask children to add the events to the appropriate day strip. Now ask children to place a card showing an o’clock time next to each event. Ask children if they can do the same with the night strip. Look and listen for children who can put the times in the correct order.

Further activities to complete at home
give children more opportunities to talk about mathematics.

Step 3
Establish with children when midnight and midday are. Encourage children to count from one, midnight, e.g. ‘1 o’clock at night, 2 o’clock at night’ moving into the day-time hours and continuing until the end of their day strip. Cut up the night strip into the twelve sections and ask children if they can start with the night section, take it in turns to arrange the night sections around the day strip. Look and listen for children who can do this correctly.

Step 4
Discuss the words ‘morning’, ‘afternoon’ and ‘evening’ and ask children to circle which hours they think these terms should cover. Give them some of these words and ask them to place them on the strip so that they think these time should be covered. Repeat the activity to reinforce these terms.

Ask children what should happen when they get to 11 o’clock or night. Children might suggest getting some more paper. Establish with children that you can add the strips round to make a circle, as time runs continuously, e.g. 11 o’clock.

Step 5
Give children the labels saying ‘midnight’ and ‘midday’ and ask children to place them on the timeline. Look and listen for children who can place these correctly. Note point to various night and morning times and ask children what they might be doing at those times. Repeat with corresponding afternoon and evening times. Encourage children to record, either by drawing or writing according to ability, what they might be doing at those times so that there is an activity for all four times (there may be lots of copies of the sleeping event!)

After completing work on this focus activity, give children the chance to take home and complete Explore More Copymaster 8: Making a Timeline.

Careful progression gives children the opportunity to become fluent through understanding.
Practice activities are included in every activity group to give children the chance to build on their knowledge.

Encouraging children to work together in practice activities gives valuable opportunities to engage in mathematical conversations.

Next steps to find out more about Numicon

www.oxfordprimary.co.uk/numicon has a wealth of information about Numicon, including video introductions to resources, free teaching support and details of our NCETM accredited Professional Development.

Visit the website to also:

- Find out more information about the new publishing for Spring 2014
- Book your place on a free head teacher introductory event
- Discover how Numicon raises achievement in mathematics with example case studies

Contact your local Primary Education Consultant for advice and to purchase Numicon Resources. Please call 01536 452610 or find your local rep at www.oxfordprimary.co.uk
About the Numicon Project

The Numicon Project is a collaborative endeavour to facilitate children’s understanding and enjoyment of maths.

The Project was founded in the daily experience of intelligent children having real difficulty with maths, the frequent underestimation of the complexity of the ideas that we ask young children to face and a recognition of the importance of maths to them and to society as a whole.

We appreciate the complexity of these early number ideas and seek to foster the self-belief necessary to achieve in the face of difficulty, we are not about ‘making maths easy’.

We believe that the combination of action, imagery and conversation helps children to structure their experiences, which is such a vital skill for both their mathematical and their overall development.

By watching and listening to what children do and say, we and many others are finding that our developing multi-sensory approach provides learners with the opportunity to play to their strengths, thereby releasing their potential to enjoy, understand and achieve in maths. This enjoyment in achievement is also shared by teachers and parents.

We strive to support teachers’ subject knowledge and pedagogy with teaching materials, professional development and on-going feedback as we continue to develop a better understanding of how we can work together to encourage all learners in the vital early stages of their own mathematical journey.