numicon®

Online Numicon 4 Sample

Number Pattern Calculating

OXFORD UNIVERSITY PRESS

Numicon teaching progression: Number, Pattern and Calculating 4 and Geometry, Measurement and Statistics 4

The Numicon teaching progression chart gives an overview of the expected coverage over the school year and the recommended order for teaching the activity groups. (Statistics work has been included within the Geometry and Measurement activity groups through appropriate contexts.)

See the long- and medium-term planning documents for Number, Pattern and Calculating 4 and Geometry, Measurement and Statistics 4 for references to assessment milestone statements; a fantastic tool for measuring children's progress.

Strand and activity group number		Activity group title
Getting Started		Getting started with Number, Pattern and Calculating 4
Calculating	1	Using adding and subtracting facts and understanding inverse relationships
Numbers and the Number System	1	Understanding place value in 4-digit numbers
Pattern and Algebra	1	Exploring sequences and number patterns
Numbers and the Number System	2	Ordering and comparing numbers to 1000 and beyond
Calculating	2	Strategies for bridging when adding and subtracting
Numbers and the Number System	3	Estimating and rounding
Geometry	1	Classifying triangles and quadrilaterals
Calculating	3	Developing fluency with mental adding strategies
Calculating	4	Developing fluency with mental subtracting strategies
Calculating	5	Developing fluency with multiplying facts to 12 × 12
Calculating	6	Developing fluency with dividing facts to 12 × 12
Pattern and Algebra	2	Exploring inverse relationships
Calculating	7	Mental strategies for multiplying and dividing by 10 and 100
Geometry	2	Understanding reflective symmetry
Numbers and the Number System	4	Introducing negative numbers
Numbers and the Number System	5	Fractions and recognizing part-whole relationships
Calculating	8	Developing fluency with the column method of adding
Calculating	9	Developing fluency with the column method of subtracting
Geometry	3	Investigating angles in shapes
Numbers and the Number System	6	Introducing decimal fractions

Strand and activity group number		Activity group title
Pattern and Algebra	3	Exploring 'equals' in balancing number sentences
Calculating	10	Exploring the distributive property and developing written methods of multiplying
Calculating	11	Using multiplying facts to solve dividing problems
Pattern and Algebra	4	Exploring multiples and factors
Calculating	12	Developing fluency with the short written method of multiplying
Calculating	13	Developing fluency with the short written method of dividing
Calculating	14	Solving problems involving more than one step
Measurement	1	Finding times and durations, and using 24-hour clock
Pattern and Algebra	5	Looking for growing patterns in problem solving
Geometry	4	Reading and plotting positions using coordinates
Numbers and the Number System	7	Exploring equivalence in fractions and introducing proportion
Numbers and the Number System	8	Introducing decimal fractions with two places
Measurement	2	Calculating with money amounts
Measurement	3	Understanding and using units of length and distance
Measurement	4	Understanding and using units of mass
Measurement	5	Understanding and using units of capacity and volume
Pattern and Algebra	6	Solving problems and puzzles systematically
Measurement	6	Understanding perimeter and area
Pattern and Algebra	7	Exploring general rules, reasoning and logic

Numbers and the Number System 6: Introducing decimal fractions

Key mathematical ideas Equivalence, Fractions, Multiplying, Place value, Rounding, Mathematical thinking and reasoning

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. The number line is used as the context in which children are encouraged to consider the numbers that lie between whole numbers, and to understand that tenths can be expressed as both common and decimal fractions. Place value within decimal fractions is linked with scaling up or down 10 times, and practical activities using Numicon 10-shapes on a Decimal Baseboard Laminate support children's understanding and their ability to use decimal notation. In the concluding activities, children apply their knowledge of place value to comparing and ordering decimal fractions.

Learning opportunities

- To understand that fractions fall 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 serves to separate the whole and the fractional parts of a mixed number.
- To use knowledge of place value to connect the column value to the quantity value of decimal fractions.
- To use place value understanding to compare and order decimal fractions.
- To round decimal fractions.

Terms for children to use

intervals, measuring scales, tenth, decimetre, decimal fraction, common fraction, whole number, in between, decimal point, rounding, place value

Assessment opportunities

Look and listen for children who can:

- Use the terms for children to use 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 the value of a digit increases 10 times when moved one place to the left and decreases 10 times when moved one place to the right.
- Explain that the digit in the first decimal place represents the number of tenths.
- Show decimal fractions correctly using place value cards.
- Compare and order decimal fractions.
- Round decimal fractions to the nearest whole number.

NPC Milestone 4

- To know that the decimal point serves to separate the whole numbers and the fractional part of a mixed number (NPC 4:4a)
- To express tenths as common fractions and decimal fractions (NPC 4:4b)
- To use place value understanding to compare and order decimal fractions with one decimal place (NPC 4:4c)

Explorer Progress Book 4b, pp. 16–17

After completing work on this activity group, give small focus groups of children their Explorer Progress Books and ask them to work through the challenges on the pages. As children complete the pages, assess what progress they are making with the central ideas from the activity group. Refer to the assessment opportunities for assistance.

Explore More Copymaster 14: Milk Round

After completing work on Activity 4, give children Explore More Copymaster 14: Milk Round

Pupil Book 4, pp. 78–81

These pages in the Pupil Book provide further practice and challenging questions. You can use them to follow up the activities and deepen the learning.

Focus activities

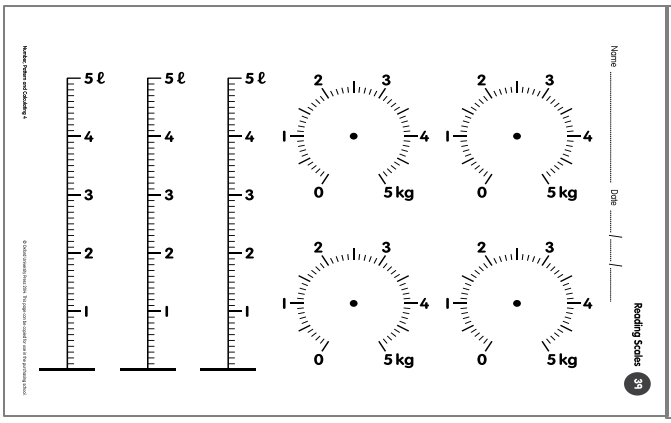
1. Introducing decimals through measuring
2. Reading scales
3. Making connections with fractions on a number line
4. Introducing decimal notation
5. Representing decimal fractions with Numicon Shapes
6. Representing decimal fractions using place value cards and base-ten apparatus
7. Comparing decimal quantities
8. Ordering decimals in a list
9. Rounding decimals

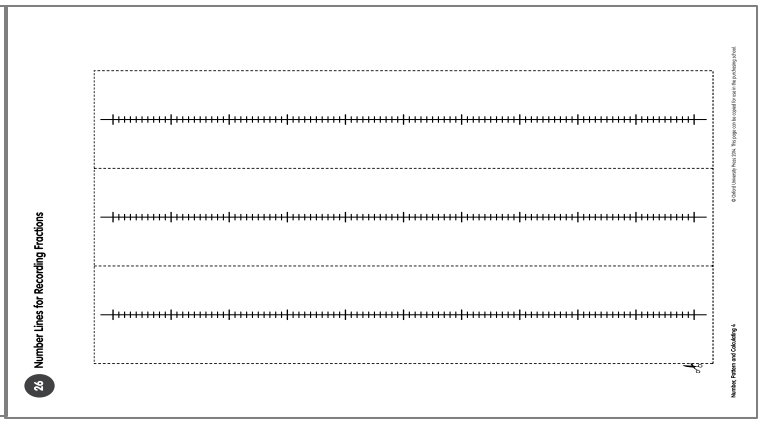
Key Mathematical Ideas provide a summary of the important concepts covered this week

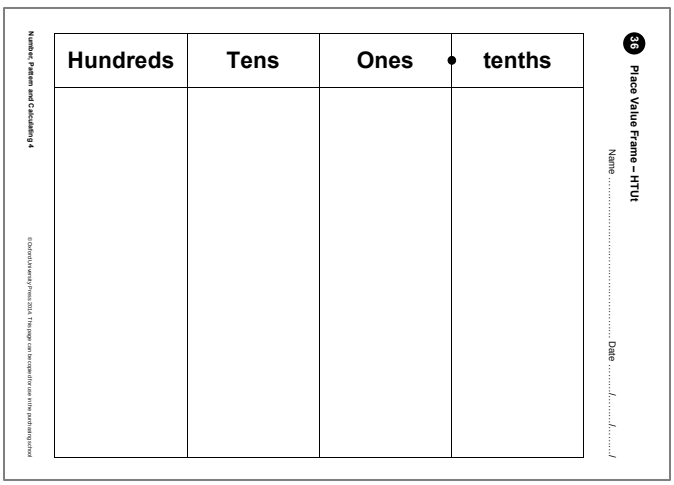
Learning Opportunities are linked with the Assessment opportunities, detailing the range of Focus Activities for this week

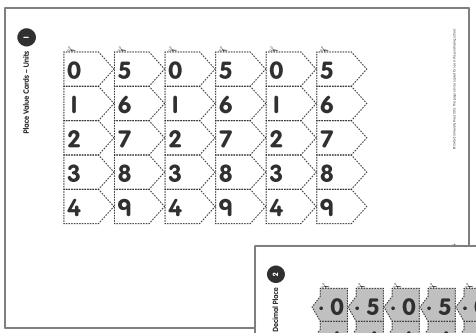
Assessment is supported by Explorer Progress activities at the end of the week or later. These are recorded along with the Milestones to provide a record of learning that is stored in the assessment Tracker

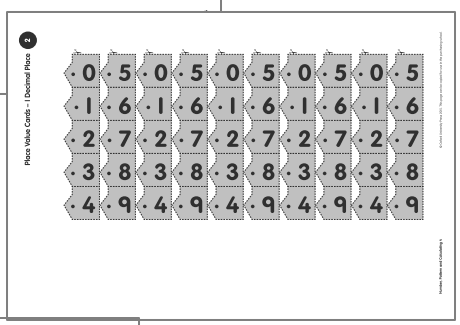
Photocopy Masters

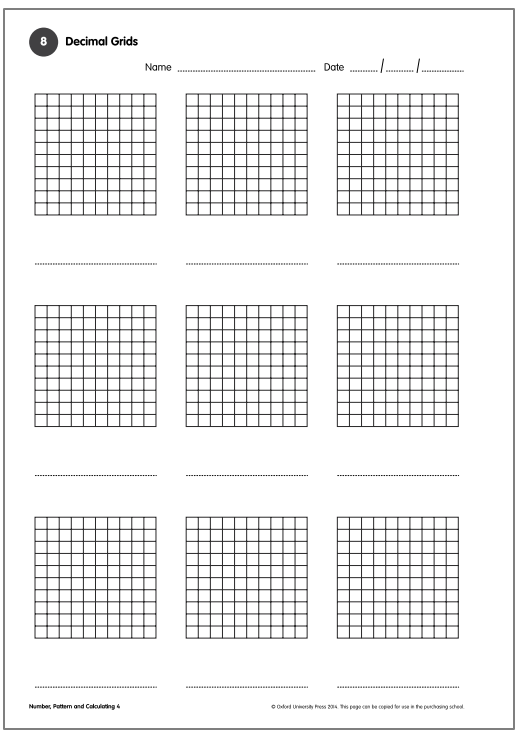


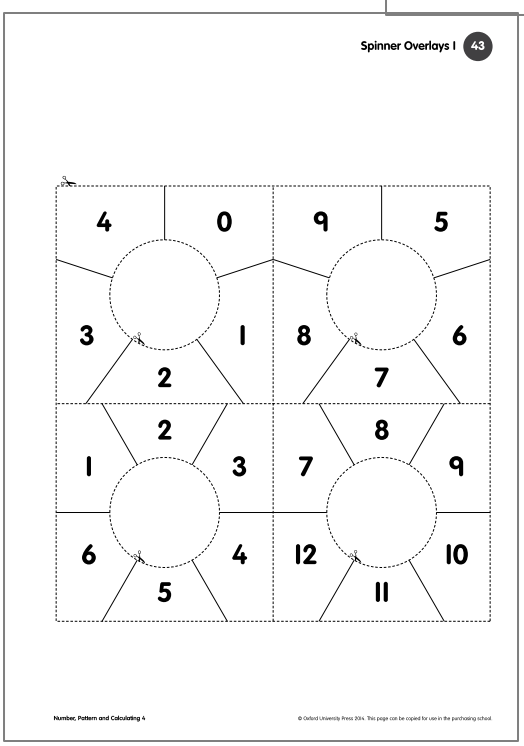












1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

Learning opportunities:

- See all learning opportunities

Terms for children to use:

intervals, measuring scales, tenth, decimetre, decimal fraction, common fraction, whole number, in between, decimal point, rounding, place value

Have ready:

- metre sticks
- objects to measure

Practice and discussion: Whole-class

- Discuss with children how and when the mathematics they have been learning could help them in solving problems.
- Practise reading and writing decimal numbers with children, e.g. 4·1 is '4 point 1', '3 point 4' is 3·4.
- Starting at any whole number, ask children to count either forwards or backwards in intervals of 0·1. Vary by counting in tenths, e.g. $\frac{3}{10}$, $\frac{4}{10}$, $\frac{5}{10}$.
- Draw a 0–1 number line with ten intervals. Ask children to count along the number line forwards and backwards and to find any given interval. Extend the number line to 2 or 3.
- Ask children to write a fraction equivalent to a decimal and vice versa, e.g. $2\frac{1}{2} = 2{\cdot}5$, $4{\cdot}5 = 4\frac{1}{2}$, $3\frac{1}{10} = 3{\cdot}1$, $4{\cdot}2 = 4\frac{2}{10}$.
- Display a range of decimal numbers. Ask children to talk about the whole and the fractional parts of each number.
- Show children different volumes, masses and lengths on measuring instruments or scales for them to read aloud, e.g. read 4·3 kg from weighing scales.
- Use the phrase 'in between' when describing decimal numbers, e.g. 4·6 is in between 4 and 5.
- Collect photographs to show decimal fractions in use, e.g. petrol stations, downloading data.
- Ask children to talk about the connections between decimal and common fractions, and then to convert from one to the other, e.g. $5{\cdot}6 = 5\frac{6}{10}$.
- Using Numicon 0–100 Numeral Cards on a place value frame – HTOt (photocopy master 36), ask children quick-fire questions which involve dividing a 1- or 2-digit number by 10 and identifying the value of the digits.

1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

Links:

Full activity group overview
Starter image
Whole-class practice and discussion
Photocopy masters
Implementation guide
Pupil Book 4 opening questions p. 78
Pupil Book 4 Answer Book
IWB Software
MyMaths

Next steps:

Explorer Progress Book 4b, pp. 16–17
Explore More Copymaster 14: Milk Round
Numicon 4 Milestone Assessment cards (NPC 4:4a, NPC 4:4b, NPC 4:4c)
Numicon 4 Milestone Tracking chart

Implementation Guide

Introducing decimal fractions

Fractions are a complex idea, and there are several different symbolic ways of representing what are essentially the same kinds of numbers (decimals, ratios, percentages). One of the key challenges for teachers at this stage is to guide children to understanding that common fractions, decimal fractions, percentages and ratios are essentially just different forms of notation for the same 'rational' numbers, and that 'ratio' is at the heart of multiplicative thinking.

In Number, Pattern and Calculating 1 and 2 common (or 'vulgar') fractions and their notation began to be introduced, and were related to whole numbers through representation as distances along a number line. In Number, Pattern and Calculating 3, the terms 'numerator' and 'denominator' were formally introduced, counting on and back in fractions was further developed, and fractions (< 1) with the same denominator were added and subtracted. In Number, Pattern and Calculating 4, common fractions feature more prominently, and key associated developments involve the introduction of decimal fractions, mixed numbers and improper fractions. Importantly, recognizing the equivalence of a range of fractions (< 1) is also emphasized.

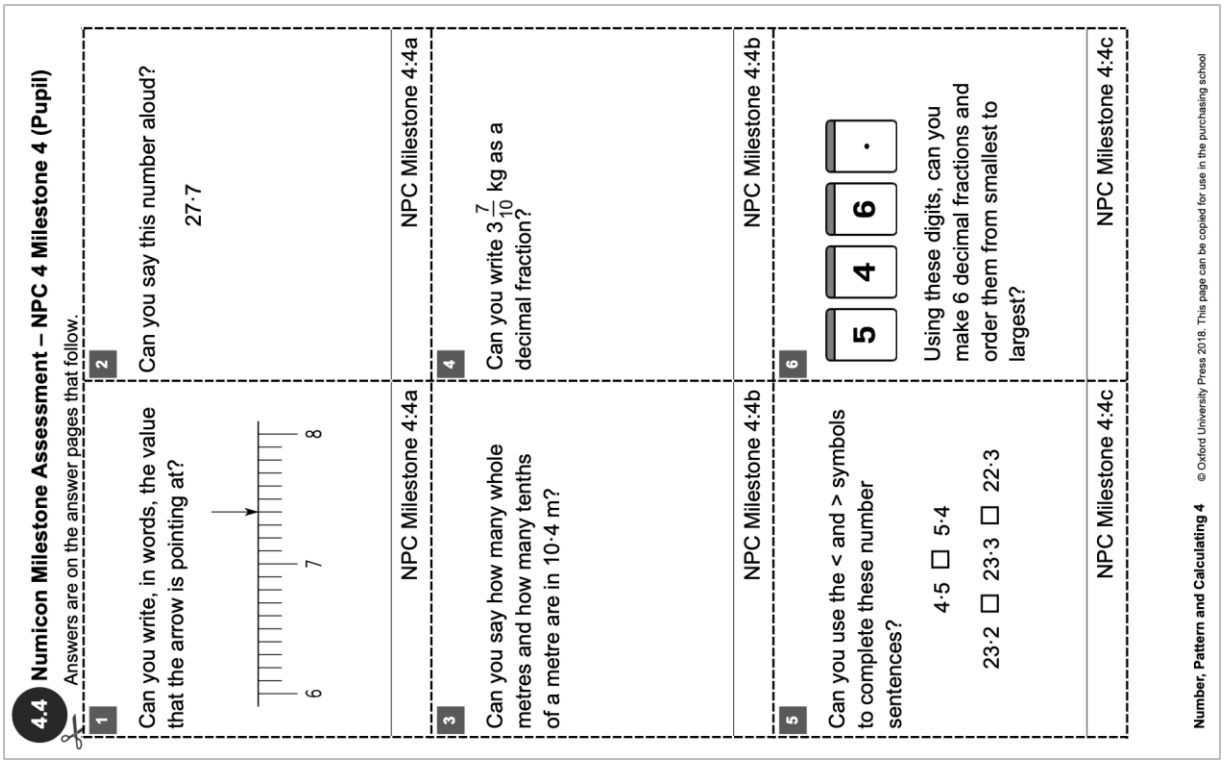
Typically for young children, fractions arise in measuring situations (which include those involving 'sharing'). Measuring is always approximate and for this reason we find ourselves quickly needing parts of whole units to describe amounts accurately. The moral imperative for 'fair' shares usually draws children easily to the view that fractions are (and indeed should be) equal parts of a whole.

The two main ways in which children have initially experienced fractions in the Numicon teaching programme are as 'descriptors' and as 'operators' – or as adjectives and verbs. As a consequence of certain dividing calculations (or measuring tasks), children met fractions as adjectives, for example as 'twenty-six-and-a-half somethings', or as the description of a distance, for example as 'halfway' between 26 and 27 on a measuring scale. On the other hand, the invitation to 'find half of twenty-six' was an invitation to halve 26 – the same word functioned as a verb, as an implied instruction to do something.

Focus activities

1. Introducing decimals through measuring
2. Reading scales
3. Making connections with fractions on a number line
4. Introducing decimal notation
5. Representing decimal fractions with Numicon Shapes
6. Representing decimal fractions using place value cards and base-ten apparatus
7. Comparing decimal quantities
8. Ordering decimals in a list
9. Rounding decimals

Assessment Cards & Tracker



4.4 Numicon Milestone Assessment – NPC 4 Milestone 4 (Pupil)

Answers are on the answer pages that follow.

1 Can you write, in words, the value that the arrow is pointing at?

NPC Milestone 4:4a

2 Can you say this number aloud?

27·7

NPC Milestone 4:4a

3 Can you say how many whole metres and how many tenths of a metre are in 10·4 m?

NPC Milestone 4:4b

4 Can you write $3\frac{7}{10}$ kg as a decimal fraction?

NPC Milestone 4:4b

5 Can you use the < and > symbols to complete these number sentences?

4·5 ☐ 5·4

23·2 ☐ 23·3 ☐ 22·3

NPC Milestone 4:4c

6 5 4 6 .

Using these digits, can you make 6 decimal fractions and order them from smallest to largest?

NPC Milestone 4:4c

Milestone	NC strand	John Smith	
Number, Pattern & Calculating 4 Milestone 4		Started	Not sta
By this point, children should be able:		2 out of 11	0 out
• To know that the decimal point serves to separate the whole numbers and the fractional part of a mixed number	Fractions		
• To express tenths as common fractions and decimal fractions	Fractions		
• To use place value understanding to compare and order decimal fractions with one decimal place	Fractions		
• To know that three numbers can be multiplied together in any order and the product will be the same	Multiplication & division		
• To find missing numbers in balancing number calculations involving adding, subtracting and multiplying	Multiplication & division		
• To know that brackets are used to show the order in which calculations are carried out	Multiplication & division		
• To develop strategies for comparing and adjusting calculations	Number & place value		
• To review numbers involved in a subtracting calculation to make a reliable estimate and decide whether a written column method is the most efficient	Addition & subtraction		
• To know that using the inverse relationship between adding and subtracting is useful when checking calculations	Addition & subtraction		
• To use known multiplying facts and the distributive property to derive and record other multiplying facts	Multiplication & division		
• To use a doubling strategy and understanding of the distributive property to derive unfamiliar multiplying facts	Multiplication & division		

GREEN - Achieved

ORANGE – On the way

RED – Target…

Not started

Numicon 4 Explore More – Activities for School & Home

Success at school then fun activities for home-optional!

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

Short, simple instructions guide parents through the activity.

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

Simple illustrations help to explain the purpose of activities.

Milk Round

How this will help your child

- This activity will allow them practice in writing and saying decimal numbers.
- It will help them to understand that 'tenths' are ten times smaller than whole numbers.

Words and phrases to use

whole, part, tenth, decimal fraction

You will need

- Scissors
- Pencil

Look at what your child can do

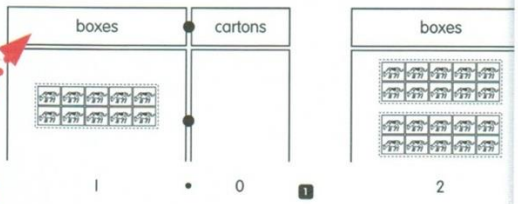
- Use pictures to show decimal fractions.
- Write and say decimal fractions.

What to do

- Give your child the Milk Round sheet. Look at the school plan and the milk cartons and boxes.
- 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 (0.1) of a whole box.
- Cut out the 2 box cards and the 9 carton cards.
- Ask your child to find Class 5A on the plan and to read the number out loud (one point zero). Use a box card to show 1.0 on the grid. 1
- Show them how this is recorded in the class list. 1 whole box and 0 cartons (1.0 boxes) is enough milk for 10 children.
- Repeat for other classes, such as Reception B, 2.3 boxes. 2
- Encourage your child to say the number out loud, e.g. two point three.
- Work your way through every class on the plan, each time writing the decimal fraction and the number of children.

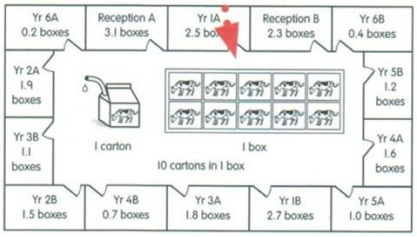
Next steps...

- Create the order for delivering milk to each classroom, from the cl… milk to the class needir…
- Use digital measuring d… e.g. a thermometer, to m… amounts. Read the deci…

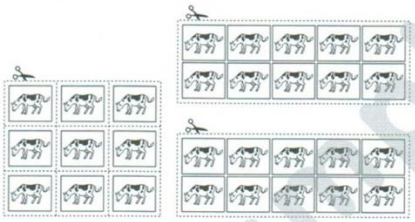


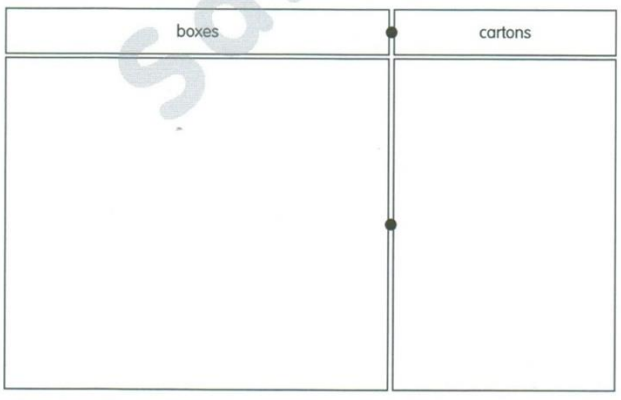
Name ..... Date ..../..../.... 14

Milk Round



Class	Boxes	Children
5A	1.0	10





Numicon Explorer Progress Books – Assessment

Success!

Have ready: Numicon 10-Shapes, Decimal Place Value Frame (photocopy master 10), Decimal Baseboard Laminates (photocopy master 11), Decimal Number Line (photocopy master 12)

Date ____/____/____

How Much Sugar?

Arrange these amounts of sugar along the number line.

Choco Pops	Nutty Honey Flakes	Choco Bubbles	Malties	Snap Pops	Tasty Flakes		
14.8 g	13.6 g	12.8 g	6.2 g	4 g	3.2 g	10 g	5.4 g

What is the difference between the highest and lowest amounts?

Can you explain how you worked this out?

Teacher notes

Numbers and the Number System 6: Introducing decimal fractions

16

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.

Have ready: Numicon 0–9 Numeral Cards, Numicon 10-Shapes, Decimal Place Value Frame (photocopy master 10), Decimal Baseboard Laminates (photocopy master 11), Decimal Number Line (photocopy master 12)

Date ____/____/____

Making Decimal Fractions

0 1 2 3 4 5 6 7 8 9 10

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?

Teacher notes

17

Numbers and the Number System 6: Introducing decimal fractions

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.

Focus Activity 1

1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

Step 1

Ask children to measure one or two objects around the room with metre sticks. Talk about how many of these 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 these objects more accurately. 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'.

1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

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 and each is $\frac{1}{10}$ of the whole stick.

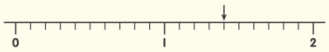
1: Introducing decimals through measuring

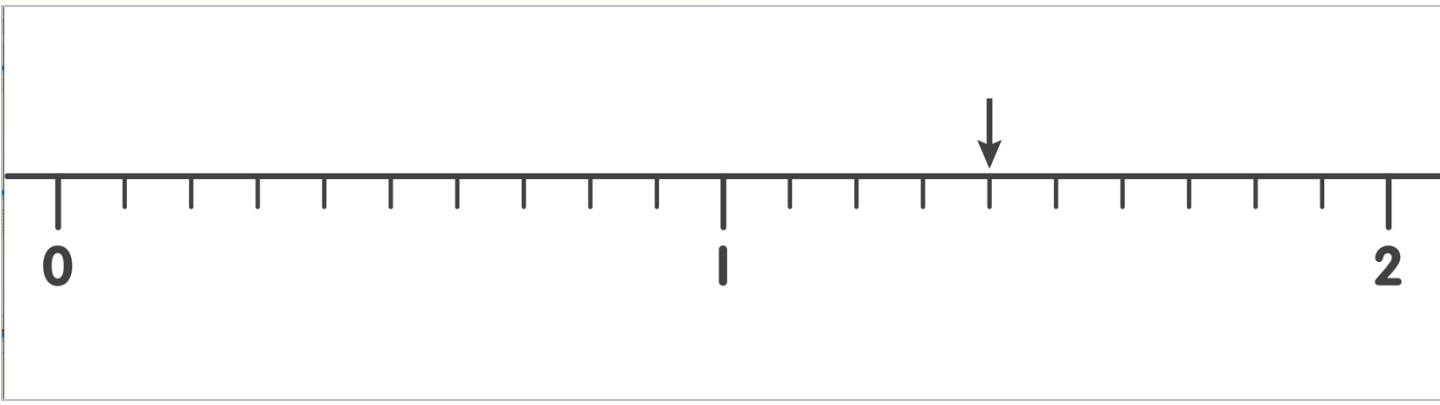
Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

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 and 4 10 m. Say this as 'one whole metre stick and four tenths of a metre'. Draw a number line on the board so children make connections between the measuring activity and the number line. Model locating the whole numbers on the number line and then counting along in tenths, e.g. '1 metre, 1 metre and 1 tenth, 1 metre and 2 tenths, … ' to identify the measurement (see image).





1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

Step 4

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

1: Introducing decimals through measuring

Quit activity

Intro | Links | 1 | 2 | 3 | 4 | +

Individual work

Have ready: Reading Scales (photocopy master 39)

Give children a copy of Reading Scales (photocopy master 39). Ask them to draw arrows or lines on the scales to mark measurements in whole numbers and common fractions, e.g. 1 and $\frac{6}{10}$.

Numicon Pupil Book 4 pp. 78–81
Numicon Pupil Book 4 Answer Book pp. 40–41

Focus Activity 2

2: Reading scales

Quit activity

Intro | Links | 1 | 2 | +

Learning opportunities:

- See all learning opportunities

Terms for children to use:

intervals, measuring scales, tenth, decimetre, decimal fraction, common fraction, whole number, in between, decimal point, rounding, place value

Have ready:

numicon

- Reading Scales (photocopy master 39)
- weighing scales
- capacity vessels
- objects to weigh or measure the capacity of

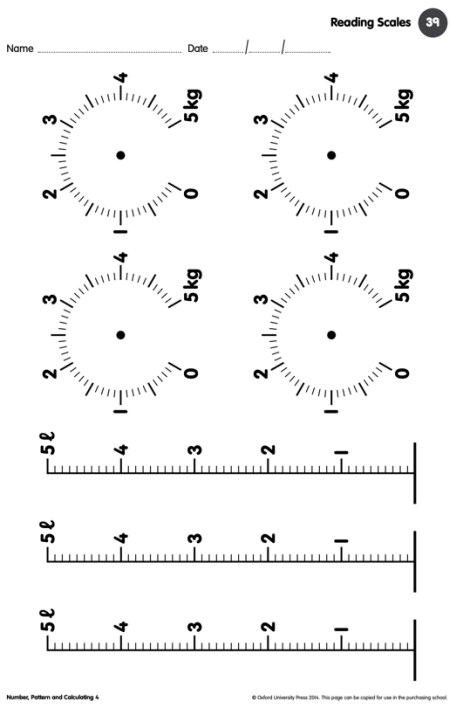
2: Reading scales

Quit activity

Intro | Links | 1 | 2 | +

Step 1

Talk with children about weighing scales and capacity vessels which have scales marked with 10 intervals between the labelled amounts. Show them the scales on Reading Scales (photocopy master 39). Ask them to explain what the instruments with these scales measure and to make comparisons between the scales. Listen for children talking about 10 intervals between each label on the scales and calling these tenths.



2: Reading scales

Quit activity

Intro | Links | 1 | 2 | +

Step 2

Repeat Activity 1, Step 3, but this time measure mass and capacity of objects and record these measurements in whole units and tenths of a unit on a number line. Measurements can also be read from markers placed on the scales (photocopy master 39).

2: Reading scales

Quit activity

Intro | Links | 1 | 2 | +

Individual work

Have ready: Reading Scales (photocopy master 39)

Give children a copy of Reading Scales (photocopy master 39). Ask them to draw arrows or lines on the scales to mark measurements in whole numbers and common fractions, e.g. 1 and $\frac{6}{10}$.

Numicon Pupil Book 4 pp. 78–81
Numicon Pupil Book 4 Answer Book pp. 40–41

Pupil Book 4 opening questions - part 3

Quit activity

p.66 | p.70 | p.74 | p.78 | p.82 | p.86 | p.90 | p.94

Key Mathematical ideas in Numicon 1-4

Teaching Progressions can be found under Supporting Resources on www.numicon.co.nz. These show when to connect NPC and GMS into your programme during the year.

	Number, Pattern and Calculating	Geometry, Measure and Statistics
Numicon 1	• Counting objects to at least 30 • Ordering numbers to 20 • Counting in two's, five's, and ten's • Understanding place value of 2-digit numbers • Reading, writing and understanding +, -, <, > • Adding and subtracting facts to 10 • Recognising halves and quarters of wholes	• Making tiling, repeating and growing patterns • Making, naming and sorting 2D and 3D shapes • Exploring properties of 2D and 3D shapes • Giving directions, describing, turns and rotations • Comparing and ordering mass, capacity and length • Understanding time duration • Telling the time to the hour and half hour • Understanding money
Numicon 2	• Patterns and sequences of 2s, 5s, and 10s • Counting to 100 and beyond • Comparing and ordering numbers to 100 • Recognise the place value of 2-digit number • When/how to add/subtract to solve problems • Adding and subtracting facts to 20 • Working with multiplying and dividing • Recognising halves, quarters and thirds of wholes • Understanding fractions as numbers	• Making and classifying polygons • Identifying/describing faces, edges, vertices of 3D • Symmetrical patterns, identifying lines of symmetry • Identifying and naming prisms • Exploring fractions of rotations • Creating block graphs and bar graphs • Telling the time to five minutes, including quarter past/to the hour
Numicon 3	• Developing fluency - + - in 2- and 3-digit numbers • Exploring multiplying and dividing • Partitioning 2- and 3-digit numbers • Comparing and ordering numbers to 1000 • Using apparatus and imagery in + - x ÷ • Understanding fractions of a wholes & numbers • Using fraction notation	• Building skeleton 2D and 3D shapes • Identifying regular and irregular polygons • Making and identifying right angles and types of lines • Sorting 2D and 3D shapes using sorting diagrams • Describing position and movement on a grid • Telling the time (analogue and digital) 12-hour clocks • Measuring mass, capacity, length using standard units • Understanding discrete and continuous scales
Numicon 4	• Understanding place value in 4-digit numbers • Ordering and comparing numbers to 1000+ • Developing fluency with mental and written methods for adding and subtracting • Developing fluency with multiplying and dividing facts to 12 x 12 • Developing fluency with mental and written methods for multiplying and dividing • Exploring negative numbers • Exploring decimal fractions • Exploring equivalent fractions	• Sorting/classifying triangles and quadrilaterals • Making/identifying symmetrical figures • Making/identifying types of angles in polygons • Plotting /reading co-ordinates in the first quadrant • Describing/drawing translations on a co-ordinate grid • Measuring mass, capacity and length using decimals • Calculating area and perimeter of rectilinear shapes • Collating, comparing, presenting monetary data • Reading/creating tables and graphs • Telling the time (analogue/digital 24-hour clocks) • Time duration

Breaking Barriers covers a summary of the concepts in Numicon 1, 2 and 3 at a pace to enable students with high Learning Needs to participate in the same class environment as their peers. Numicon supports inclusive education practice.

Numicon Intervention Programme covers the key mathematical ideas in Numicon 1, 2, and 3 in a 12-15 week intervention either as part of the classroom environment or in a separate environment. A Diagnostic Assessment in mathematics determines the starting point and teaching programme for each student to close the gap between the students who are struggling and their average-achieving peers.

Key Mathematical ideas in Numicon 5 and 6

Teaching Progressions can be found under Resources on www.numicon.co.nz. These show the connections of the strands during the year.

Numicon 5	• Reading/working -digits & multiples to seven places • Interpreting negative numbers in context • Recognise/describe linear number sequences, rules • + And - numbers 4 plus digits, algorithms reasoning • Square numbers (2) and cubed (3) • Scaling by simple fractions and simple rates • Fractions –multiples, equivalent, tenths and hundredths, mixed, improper fractions • + And – fractions, x proper fractions/mixed numbers • Decimal -fractions, hundredths, tenths & decimal equivalents, rounding • Per cent %, fraction and as a decimal • Percentage & decimal equivalents of ½, ¼ 1/10, with a multiple of 10 or 25	• Convert between different units of metric measure and solve problems involving converting between units of time • Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • Calculate and compare the area of rectangles • Estimate volume • Use all four operations to solve problems involving measures using decimal notation, including scaling. • Angles -drawn, measured in degrees • Line graphs, complete, read and interpret information in tables, including timetables
Numicon 6	• Read, write, order and compare numbers to 10 million • use negative numbers and calculate across 0 • long multiplication up to 4 digits • long division up to 4 digits, and interpret remainders as whole number remainders, fractions, or by rounding • common factors, common multiples and prime numbers • Addition and subtraction multi-step problems in contexts • common factors to simplify fractions • + - fractions with different denominators and mixed numbers, multiply simple pairs of proper fractions, divide proper fractions by whole numbers • calculate decimal fraction equivalents for a simple fraction • identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 • multiply one-digit numbers with up to 2 decimal places • written division methods in cases where the answer has up to 2 decimal places • equivalences between simple fractions, decimals and percentages, including in different contexts • use integer multiplication and division facts where missing values can be found • calculation and comparison of percentages • solve problems involving similar shapes where the scale factor is known or can be found • Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples • simple formulae and linear number sequences • Express missing number problems algebraically • Find pairs of numbers that satisfy an equation with 2 unknowns • enumerate possibilities of combinations of 2 variables	• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate • Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3 decimal places • Convert between miles and kilometres • Recognize that shapes with the same areas can have different perimeters and vice versa • Recognize when it is possible to use formulae for area and volume of shapes • Calculate the area of parallelograms and triangles • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3] • Draw 2-D shapes using given dimensions and angles • Recognize, describe and build simple 3-D shapes, including making nets • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • Recognize angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles • Describe positions on the full coordinate grid (all 4 quadrants) • Draw and translate simple shapes on the coordinate plane, and reflect them in the axes • Interpret and construct pie charts and line graphs and use these to solve problems • Calculate and interpret the mean as an average

Next steps to find out more about Numicon

www.numicon.co.nz has a wealth of information about Numicon, including video introductions to resources, free teaching support and details of professional development.

Visit the website to:

- Find out more about the Numicon Approach
- Book your place on a course at www.edushop.nz
- Discover how Numicon raises achievement in mathematics with example case studies. The flow-on effect is seen in other subjects too.
- Join the mailing list to learn about events, tips and courses in your area. Emails are generally sent one per school term.