

NPC 5 – Getting Started

Organisational Planning and Assessment

1. Look at the year's overview of NPC and GMS
2. Go to the Long Term Planning in NPC or GMS
3. Go to Medium Term Planning to see where your desired concept fits along with the Milestones to make sure you have provided the foundations in sequence for this concept
4. Look through the Individual Pupil Assessment Record- Milestone grids at the beginning of Photocopy Masters in the Teaching Resource Handbook
5. Go to the activity group- first page for planning and overview
6. Look at Explore More for homework or extra classroom activities
7. Look at the Explorer Progress Books for Student Assessments
8. Get ready all the apparatus, resources and photocopy masters
9. Enjoy the exciting learning activities planned and incorporate any of your own using your teacher judgment!

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

The long-term planning chart gives an overview of the expected coverage over the school year and the recommended sequence of learning for the whole school. It also includes the recommended number of weeks for each concept and the recommended pace for each concept.

Milestones indicate the skills of understanding children need to be secure in as they progress through the teaching programme through demonstrating these skills in a variety of contexts. Specific details about the milestones can be found in the medium term planning chart.

Strand and activity	Activity group title
Solving Number	Giving started with Number, Pattern and Calculating 4
Calculating	Developing fluency with mental adding and subtracting strategies
Number and Algebra	Understanding place value in 4-digit numbers
Calculating	Exploring sequences and number patterns
Calculating	Developing strategies for number problems in 1000 and beyond
Calculating	Strategies for solving addition and subtracting strategies
Number and the Number System	Exploring integers and quotients
Calculating	Developing fluency with mental addition strategies
Calculating	Developing fluency with mental subtraction strategies
Calculating	Developing fluency with multiplying facts to 12 x 12
Calculating	Developing fluency with dividing facts to 12 x 12
Pattern and Algebra	Exploring inverse relationships
Calculating	Developing strategies for multiplying and dividing by 10 and 100
Geometry	Understanding reflected symmetry
Number and the Number System	Introducing negative numbers
Calculating	Fractions and recognising part-whole relationships
Calculating	Developing fluency with the column method of adding
Calculating	Developing fluency with the column method of subtracting
Geometry	Recognising shapes in objects
Numbers and the Number System	Introducing decimal fractions

Long-term planning	
The long-term planning chart gives an overview of the expected coverage over the school year and the recommended sequence of learning for the whole school. It also includes the recommended number of weeks for each concept and the recommended pace for each concept.	
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Calculating	Developing fluency with the column method of subtracting
Geometry	Recognising shapes in objects
Numbers and the Number System	Introducing decimal fractions
Calculating	Exploring the distributive property and developing different methods of multiplying
Pattern and Algebra	Exploring equal in balancing number sentences
Calculating	Exploring the distributive property and developing different methods of multiplying

Strand and Activity Group	
Getting Started	
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Key mathematical ideas Primary, Adding, Subtracting, Multiplying, Dividing, Place Value, Comparing, Ordering, Counting, Recognising, Identifying, Describing, Explaining, Estimating, Reasoning, Problem Solving

Getting Started

Getting started with apparatus and imagery



This activity helps children to become familiar with their apparatus. Activities involve the use of apparatus and imagery to explore concepts such as number, shape and space.

Educational context: This activity is designed to introduce children to the resources available in the classroom. It provides opportunities for children to become familiar with the different apparatus and imagery available. It also helps children to understand how they can use these resources to support their learning.

Achievement opportunity: Children will demonstrate an understanding of the different apparatus and imagery available in the classroom. They will be able to identify and use these resources effectively to support their learning.

Assessment opportunity: Children will demonstrate an understanding of the different apparatus and imagery available in the classroom. They will be able to identify and use these resources effectively to support their learning.

Children who have not yet developed the practical experience and knowledge required to complete this activity: Children who have not yet developed the practical experience and knowledge required to complete this activity.

Exploring Progress Book 6, pg. 2-3

This section gives an overview of the progression of skills across the year.

It includes the following:

- To compare and order numbers

- To calculate using apparatus and imagery

- To describe the mathematical language for calculating and problem solving

- To use the mathematical language for calculating and problem solving

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Exploring Progress Book 6, pg. 5-6

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- To use the mathematical language for calculating and problem solving

Name _____ Date _____

Talking About Numicon Shapes

more	less	double	half
equal	in between	total	quarter
multiple	least	fraction	add
next	before	after	greatest
third	difference	subtract	per cent
greater than	divide	twice	less than

Name _____ Date _____

Showing Numbers

Can you show the factors of 12 with number rods?
Can you show the factors of 12 with base-ten apparatus?
Can you show a number between 234 and 257, using base-ten apparatus?
Can you show a number between 234 and 257, using Numicon shapes?
Can you show a number between 234 and 257, using Numicon shapes?

Numicon teaching progression: Number, Pattern and Calculating 5 and Geometry, Measurement and Statistics 5

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 5 and Geometry, Measurement and Statistics 5 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 apparatus and imagery
Numbers and the Number System 1	Working with numbers up to a million
Numbers and the Number System 2	Exploring equivalence with fractions
Numbers and the Number System 3	Understanding decimals
Geometry 1	Measuring angles
Calculating 1	Developing fluency with adding and subtracting calculations and understanding inverse relationships
Calculating 2	Strategies for bridging when adding and subtracting mentally
Numbers and the Number System 4	Estimating and rounding
Calculating 3	Further strategies for adding and subtracting
Pattern and Algebra 1	Exploring sequences and number patterns
Geometry 2	Transformations
Numbers and the Number System 5	Working with negative numbers
Calculating 4	Developing fluency with multiplying and dividing
Numbers and the Number System 6	Comparing and ordering fractions
Pattern and Algebra 2	Using inverse relationships to solve problems
Calculating 5	Written methods of adding
Calculating 6	Written methods of subtracting
Calculating 7	Multiplying and dividing by 10, 100 and 1000
Measurement 1	Metric and imperial units
Pattern and Algebra 3	Properties of number
Calculating 8	Using mental methods for multiplying and dividing
Calculating 9	Division with remainders
Geometry 3	Exploring angles

Strand and Activity Group Number	Activity Group Title
Calculating 10	Proportion and ratio
Calculating 11	Percentages
Measurement 2	Interpreting charts and graphs
Numbers and the Number System 7	Solving problems with fractions, decimals and percentages
Pattern and Algebra 4	Looking for patterns and generalizing
Measurement 3	Calculating area and perimeter
Calculating 12	Written methods of multiplying
Measurement 4	Estimating volume and capacity
Calculating 13	Written methods of dividing
Calculating 14	Calculating fractions of amounts
Measurement 5	Working with area and perimeter
Measurement 6	Scale drawing
Calculating 15	Calculating with fractions
Calculating 16	Solving problems involving several steps
Measurement 7	Solving problems involving time, money and measures
Pattern and Algebra 5	Using equivalence to solve problems
Pattern and Algebra 6	Logic and reasoning

Getting Started: Getting started with apparatus and imagery

Key mathematical ideas Pattern, Adding, Subtracting, Multiplying, Dividing, Place value, Mathematical thinking and reasoning

Educational context

This activity group helps children and teachers to become familiar with structured apparatus, including Numicon Shapes, number rods and base-ten apparatus, and to make connections between the patterns and structures they see and their number ideas. Actions for the four calculating symbols are also introduced.

Building familiarity with the different apparatus will enable children to choose the resources they need to support them with their work in the rest of the *Number, Pattern and Calculating 5 Teaching Resource Handbook*.

As children become more familiar with the different apparatus, encourage them to shut their eyes and visualize it. Once children are comfortable with the apparatus, ensure it is readily available and encourage them to select what they need for different activities.

This activity group will give teachers valuable insights into children's mathematical understanding. This will help with initial assessing, which in turn may inform how teachers decide to group children. If children are not accustomed to working on open-ended activities some of their initial responses may be superficial. Encourage them to persevere until they develop the confidence to find things out for themselves.

Children who have had limited or no previous experience using apparatus and imagery may need two or three days to explore these Getting Started activities before moving on to the Numbers and the Number System, Calculating, and Pattern and Algebra activity groups.

Learning opportunities

- To connect Numicon Shapes, number rods and base-ten apparatus with number ideas.
- To connect structured apparatus with numerals, number words and positions on a number line.
- To see and explain patterns in number relationships illustrated with structured apparatus.
- To describe number relationships using mathematical language.
- To revise the mathematical language for calculating operations.

- To revise actions representing the symbols of arithmetic notation: $+$, $-$, $=$, \times , \div .
- To revise use of 'is less/fewer than' and 'is greater/more than' symbols ($<$ and $>$, respectively).
- To revise methods of adding, subtracting, multiplying and dividing.

Words and terms for use in conversation

number names to 100 and beyond, pattern, next, before, after, in between, ordinal number names (e.g. first, second, third), terms for comparing (e.g. small, smaller than, smallest, long, longer than, longest, few, fewer than, fewest, more than, less than, greater than), set, add, altogether, total, more, take away, subtract, difference, decrease, how many more to reach ... ?, multiply, times, divide, share between, equal, visualize, factor, multiple, decimal, fractions

Assessment opportunities

Look and listen for children who:
 • Use the words and terms for use in conversation effectively.

- Notice and describe the attributes of Numicon Shapes and number rods and use these to sort both Shapes and rods in different ways.
 • Refer to Numicon Shapes, number rods and base-ten apparatus by number name, order them and describe relationships between them.
- Connect Numicon Shapes, number rods, numerals and number names with positions on a number line.
 • Recognize and use the language for adding, subtracting, multiplying and dividing and the symbols $+$, $-$, \times , \div , $=$, $<$ and $>$.
 • Use structured apparatus to illustrate their thinking.
 • Describe relationships they see in structured apparatus using mathematical language.
 • Use methods of adding, subtracting, multiplying and dividing effectively.

If children have ongoing difficulties they are likely to need additional and differentiated support. Refer back to the *Number Pattern and Calculating 3 and 4 Teaching Resource Handbooks* for activities to establish children's understanding of earlier ideas. If any children are experiencing more fundamental difficulties, consider running the Numicon Intervention Programme for them.

Explorer Progress Book 5a, pp. 2–3

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 1: Talking About Numicon Shapes

After completing work on Activity 1, give children Explore More Copymaster 1: Talking About Numicon Shapes to take home.

Focus activities

- What maths can you show with Numicon Shapes?
- What maths can you show with number rods?
- Finding how many without counting
- Describing relationships between Numicon Shapes or number rods
- Cover the board with Numicon Shapes
- Supporting calculating with Numicon Shapes or number rods
- What maths can you show with base-ten apparatus?

		Group: _____	Name: _____	Name: _____	Name: _____	Name: _____	Name: _____
	By this point, children should be able to:						
Milestone 1	Read, write, and convert between column and quantity values of numbers up to 1000 000 Count in steps of powers of 10 forwards and backwards from any number, and explain which digit changes when a place value boundary is crossed Explain equivalences between improper fractions and mixed numbers Use knowledge of factors and multiples to recognize and explain equivalences between proper fractions Read, write and order numbers with up to three decimal places Recognize and explain decimal and common fraction equivalents, e.g. $0.\overline{268} = \frac{268}{1000}$, including familiar common fraction equivalents, e.g. $\frac{1}{5} = 0.\overline{2}$ Choose appropriate and effective mental or written methods to solve adding and subtracting number problems involving whole numbers up to 1000 Solve adding and subtracting problems involving fractions and decimal fractions efficiently	Round whole numbers to the nearest multiple of 10, 100, 1000, 10 000, or 100 000 Round numbers with up to two decimal places to the nearest whole number and to one decimal place Convert on adding or subtracting calculation to an easier equivalent calculation Find the term-to-term rule for a linear sequence involving whole numbers, fractions or decimals, and work out missing terms Read, write and order positive and negative numbers Calculate the difference between a positive and a negative number Use multiplying and dividing facts and knowledge of factors and multiples to solve problems Solve problems effectively by finding fractions of amounts, making use of multiplying and dividing facts Multiply and divide decimals to one decimal place	Use knowledge of factors and multiples to find equivalent fractions and to simplify fractions to their lowest terms Compare and order fractions with denominators which are multiples of the same number Use the inverse relationships between adding and subtracting, and multiplying and dividing, to complete calculations with missing numbers Use efficient written column methods for adding and subtracting whole numbers up to 10 000 and decimals with up to 3 decimal places Use known multiplying facts to multiply and divide whole numbers and decimals by 10, 100, and 1000	Milestone 2	Milestone 3		

Preparation and check lists

Day 1 – Focus Teaching Activity 1 - Have ready:

- 0-100 Numicon number line
- Numicon shapes (empty them out of the boxes into a large plastic container)
- Extra 10- shapes
- Numicon 10s laminated number line. Using a whiteboard marker, label the multiples of 10.
- Numicon Decimal Baseboard Laminates
- Coloured counters
- Numicon software-optional
- Whiteboard marker pens
- Explore More Copymaster 1 – Talking about Numicon shapes
- Numeral cards 0-100 for independent activity

Day 1 – Activity 2 - Have ready:

- Cuisenaire rods
- Numicon software-optional
- Metre rulers or students' rulers or Numicon 0-100 number line, or Numicon number track
- Numeral cards 0-100 for independent activity

Day 2 – Activity 3 - Have ready:

- Individual Numicon shapes hidden in Feely Bags
- Counters
- Other objects for counting

Day 2 – Activity 4 - Have ready:

- Numicon shapes
- Cuisenaire rods
- Feely Bags
- Numicon software – optional
- Flash cards of < and >

Day 3 – Activity 5 - Have ready:

- 2 sets of Numicon shapes 1-10 per pair of students to work together on this task
- Baseboard laminates – grey side or plastic ones, 1 per pair

Day 3 – Activity 6 – Have ready:

- Numicon shapes
- 0-100 number line
- 10s number line laminate. Label this in multiples of 10.
- Cuisenaire rods
- Number tracks
- Metre rulers
- Number sentences pre-written – see on page 8 of this document
- Subtracting covers – students can cut their own from Photocopy Master (PCM) 48
- Tens and ones frame – see on Page 4 of this document – optional

Day 4 – Activity 7 – Have ready:

- Base Ten (Place value) apparatus
- Photocopy Master 39 enlarged to A3. Download the ‘ones’ version from the website. Supporting resources

Independent Activities Summary:

- Individual work for most of the activities are repeats or extensions of what the students have done in the Focus Teaching Activities
- The apparatus is the same as the activity groups, except for needing more sets of Numeral Cards 1-100

$74 + 19 =$

$29 + 49 =$

$23 + 68 =$

$13 + 57 =$

$74 - 19 =$

$99 - 45 =$

$53 - 18 =$

$79 - 49 =$

$4 \times 9 =$

$9 \times 9 =$

$17 \times 5 =$

$23 \times 4 =$

$94 \div 12 =$

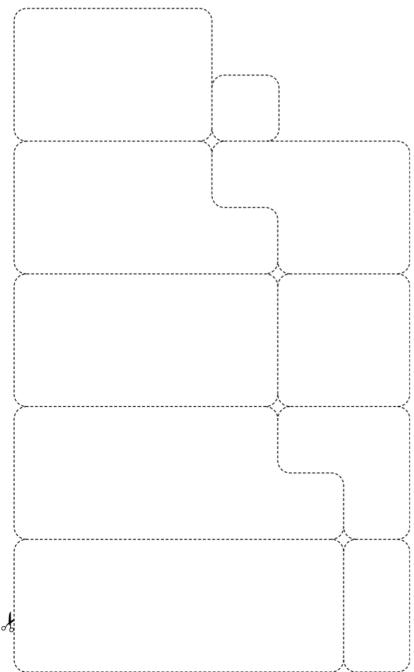
$79 \div 3 =$

$56 \div 8 =$

$81 \div 9 =$

Photocopy Masters (PCM)

Subtracting Covers 48



Number, Pattern and Calculating 5

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39 Place Value Heading Cards – HTh TTh Th HTU-th th

Hundred Thousands	Ten Thousands	Thousands
Hundreds	Tens	Units
.	tenths	hundredths
thousandths	.	.
Hundred Thousands	Ten Thousands	Thousands
Hundreds	Tens	Units
.	tenths	hundredths
thousandths	.	.
Hundred Thousands	Ten Thousands	Thousands
Hundreds	Tens	Units
.	tenths	hundredths
thousandths	.	.

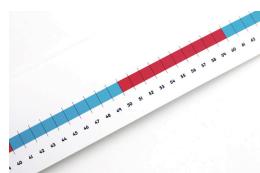
Number, Pattern and Calculating 5

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Apparatus



Numicon shapes



0-100 Number line



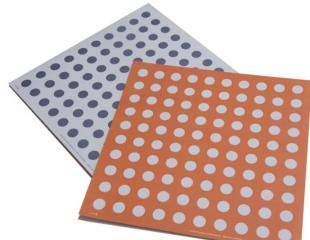
10s number line laminate



Counters



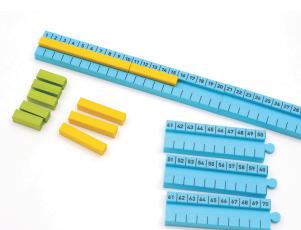
Numeral cards



Baseboard laminates - Use the grey side with whiteboard marker pens



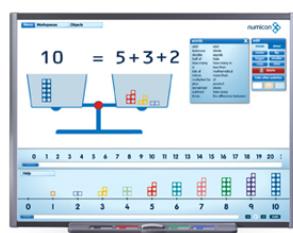
Cuisenaire Rods



Number rod track



Feely Bag



Numicon Interactive Whiteboard Software

Strand and title:

Date:

Strand and title:	Monday Class Warm-up:	Tuesday Class Warm-up:	Wed Class Warm-up:	Thurs Class Warm-up:	Friday Class Warm-up:
Short-term planning					
Activity groups					
Learning opportunities for the class	•				
Words and terms for use in conversation					
Assessment opportunities	Look and listen for children who: •				
Focused Group Work					
Independent Work					
Plenary- Whole class					
Resources	Homework: Explore More pp.				Assessment: Explorer Progress pp.