

1. Look at the year's over view 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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Strand and activity group number	Activity group title
Adding/Subtracting	Adding and subtracting Number, Pattern and Calculating 4
Counting	100s addition and subtracting facts and understanding money
Number and place value	1 understanding place value and 10s and 100s
Number and place value	2 exploring equivalent number patterns
Number and place value	3 adding and comparing numbers to 100 and beyond
Number and place value	2 strategies for adding and adding and subtracting
Number and place value	3 multiplying and dividing
Geometry	1 Classifying triangles and mental calculations
Geometry	2 Identifying lines with mental skills and calculations
Geometry	3 Identifying lines with mental calculations strategies
Geometry	3 Identifying lines with multiplying facts to 10 x 12
Geometry	3 Identifying lines with division facts to 10 x 12
Pattern and Algebra	1 exploring number relationships
Counting	2 mental strategies for multiplying and dividing by 10 and 100
Counting	3 mental strategies for multiplying and dividing by 10 and 100
Number and place value	2 multiplying negative numbers
Number and place value	2 multiplying and comparing positive and negative numbers
Counting	4 Identifying lines with the decimal method of adding
Counting	4 Identifying lines with the decimal method of subtracting
Counting	4 Identifying lines with the decimal method of adding
Number and place value	3 multiplying decimal fractions

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Milk Round

How this will help your child

- Use pictures to help child to practice writing and copying decimal fractions (decimal number)
- Find gaps in a probability chart with 10 units smaller than one whole

Words and phrases to use

whole, part, tenth, one, decimal, fraction, decimal number

You will need

- Scissors
- A pencil

During the activity, look out for your child to:

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

What to do

- 1 Look at the decimal staircase plan and the milk carton and boxes on the Milk Round sheet.
- 2 Explain how the milk carton is divided into 10 equal parts. Each part is called a tenth. The whole is called a whole. A carton is one tenth of a litre. The box is one tenth of a litre.
- 3 Cut out the three milk cans and the nine cartons.
- 4 Ask your child to find Class A on the plan and to write the number and find (one good) pair. Ask them to use a box and cut to show 1.0 and 0.1.
- 5 Explain how this has been recorded in the tables.
- 6 Ask your child to find Class B on the plan and to write the number and find (one good) pair. Ask them to use a box and cut to show 1.0 and 0.1.
- 7 Explain how the milk cartons and one box will be compared to the milk can and the milk box to complete the tables, which then writing the decimal fraction and the number of children.
- 8 Each time encourage them to say the number out loud: "one point four" or "one point four".

Next steps...

- 1 Put the classes in order from the class needing the most milk to the class needing the least.
- 2 Read amounts from digital measuring device that show grams, such as a kitchen timer or a padmeter.

Class	Cans	Cartons
Class A	1.0	1.0
Class B	1.0	1.0
Class C	1.0	1.0
Class D	1.0	1.0
Class E	1.0	1.0
Class F	1.0	1.0
Class G	1.0	1.0
Class H	1.0	1.0
Class I	1.0	1.0
Class J	1.0	1.0

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Making Decimal Fractions

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Find ten different ways to use three cards to make a number between 15 and 20.

Can you write these numbers in order from largest to smallest?

Date / /

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

Numicon 4 NPS and GMS - 2

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

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 Laminates 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.

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

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 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.

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

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

	Group: _____					
		Name:	Name:	Name:	Name:	Name:
Milestone 3	By this point, children should be able to:					
	To count backwards through zero to include negative numbers					
	To read, write and order positive and negative numbers within a range of 20 to 20					
	To know that when comparing fractions with a common denominator the larger numerator represents the larger fraction					
	To make connections between fractions of a shape or fractions of one whole and fractions of a length or of a set of objects					
	To use inverse relationships between multiplying and dividing to record number facts and find solutions to different problems including missing number problems					
	To be able to explain how to use inverse operations to check answers to a calculation					
	To review numbers involved in an adding calculation to make reliable estimates and decide whether the written column method is the most efficient					
	To know that columns are added from right to left					
	To complete column calculations, recording the carrying or redistributed digit in the correct column and referring to this as the given number of tens or hundreds to carry					
Milestone 4	To explain a general rule for multiplying and dividing by 10 and 100					
	To know that the decimal point serves to separate the whole numbers and the fractional part of a mixed number					
	To express tenths as common fractions and decimal fractions					
	To use place value understanding to compare and order decimal fractions with one decimal place					
	To know that three numbers can be multiplied together in any order and the product will be the same					
	To find missing numbers in balancing number calculations involving adding, subtracting and multiplying					
	To know that brackets are used to show the order in which calculations are carried out					
	To develop strategies for comparing and adjusting calculations					
	To review numbers involved in a subtracting calculation to make a reliable estimate and decide whether a written column method is the most efficient					
	To know that using the inverse relationship between adding and subtracting is useful when checking calculations					
	To use known multiplying facts and the distributive property to derive and record other multiplying facts					
	To use a doubling strategy and understanding of the distributive property to derive unfamiliar multiplying facts					

Preparation and check lists

Check that there are objects to measure in your room

Search the internet for :

- ☐ pictures of scales and measuring cylinders(not digital), or show the real things to show the smaller divisions. Bathroom scales are good if they are not digital.
- ☐ Photos of decimal points appearing in many different contexts, including everyday ones

Make a list for Activities 7 and 8 of numbers which also include decimal numbers. Laminate this list.

Collect:

- ☐ Weighing scales
- ☐ Metre rulers and measuring tapes, 1 per student
- ☐ Capacity vessels, eg. measuring cups and jugs
- ☐ Objects to weigh
- ☐ Items to measure their capacity, eg drink bottle and yoghurt containers
- ☐ Base 10 apparatus
- ☐ Multilink blocks, interlocking cubes
- ☐ Cuisenaire rods
- ☐ Place value cards, including the decimal ones
- ☐ Food nutrition labels showing percentages
- ☐ Blank pieces of paper (business card size), 2 per student

Prepare photocopying:

- ☐ Pages from the back of the Teaching resource Handbook- 8, 26, 36, 39, 43 (as needed) - 1 per student
- ☐ Explore More – Milk Round - Number 14, pages 31 and 32

Independent Activities Summary:

- Individual work for Activities 1 & 2 – Reading and labelling from PCM 39
- Paired or small group for Activities 3 & 4 – Labelling and discussing from PCM 26
- Paired or small group for Activity 4: Dice (1-6), Spinners with 0-4 and 5-9 overlays (PCM43), PCM 26 – labelling and discussing as in a game
- Paired or small group for Activity 5 – Decimal laminates, 1 per student, grey Numicon shapes if available – drawing and discussing, labelling
- Individual work for Activity 5 – Decimal grids from PCM 8, coloured pencils – drawing and labelling
- Paired or small group for Activity 6 – Base 10 apparatus, place value cards including 1 decimal place. Making, reading, listening, writing together
- Individual work for Activity 7 – See list prepared from above. Students to make comparisons and record these in statements using < and >
- Individual work for Activity 8 – See list prepared from above
- Paired or Individual work for Activity 9 – measuring objects, stating their weight and rounding to the nearest whole number. Verbal activity that requires no recording. Optional: recording in diary. Optional: ordering in size, weight etc. and presenting findings to the class at plenary or whole class time

Notes:

Photocopy Masters (PCM)

Reading Scales 39

Name _____ Date ____/____/____

Number, Pattern and Calculating 4

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Decimal Grids

Name _____ Date ____/____/____

Number, Pattern and Calculating 4

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Number Lines for Recording Fractions 26

Name _____ Date ____/____/____

Number, Pattern and Calculating 4

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Place Value Frame - HTU 38

Name _____ Date ____/____/____

Hundreds	Tens	Ones	tenths

Number, Pattern and Calculating 4

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Spinner Overlays 43

Name _____ Date ____/____/____

Number, Pattern and Calculating 4

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Strand and title:

Date:

Short-term planning	Monday Class Warm-up:	Tuesday Class Warm-up:	Wed Class Warm-up:	Thurs Class Warm-up:	Friday Class Warm-up:
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.

Notes

NZ Curriculum

In mathematics and statistics, students explore **relationships** in quantities, space and data and learn to express these **relationships** in ways that help them make sense of the world around them.

By studying mathematics and statistics, students develop the ability to think creatively, critically, strategically, and logically.

They learn to:

- structure and to organise,
- to carry out procedures flexibly and accurately,
- to process and communicate information,
- to enjoy intellectual challenge.

They learn to:

- estimate with reasonableness,
- calculate with precision,
- understand when results are precise
- when results must be interpreted with uncertainty.

They learn to:

- to create models and predict outcomes,
- to conjecture, to justify and verify,
- to seek patterns and generalizations.

Mathematics and statistics have a broad range of practical applications in everyday life, in other learning areas, and in workplaces.

What does this mean for our teaching?

- Open ended tasks and challenges
- Effective questioning strategies
- Making Skills and Capabilities explicit
- Opportunities to work collaboratively
- More self-directed learning
- Making connections

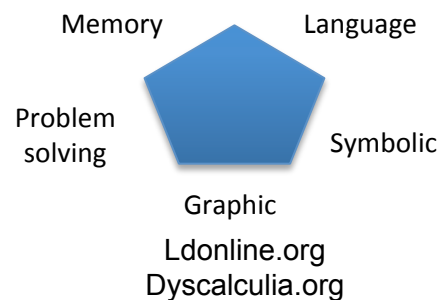
Key factors affecting learning Maths

- ability to sequence
- working memory/auditory, visual
- Processing
- Applying and Generalizing
- language skills
- motor skills
- attitude
- teaching approach

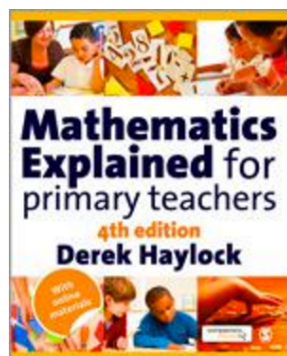
Significant issues

- Language
- Numbers are ideas, not things
- Numerals are symbols that we use to represent number ideas
- Moving from counting to calculating
- Using patterns
- Working systematically

Dyscalculia



Atm.org.uk



Jerome Bruner

- Enactive
- Iconic
- Symbolic
- Concrete
- Pictorial
- Abstract