New Zealand Curriculum Phase 3 Year 7 with Numicon 5

Numicon is a proven approach to teaching and learning designed to give children the understanding of mathematical ideas and relationships that is essential for successful reasoning and problem-solving. The use of apparatus builds children's mental image of abstract concepts, and helps to develop their understanding of the connections between different areas of mathematics. The resources cover the key mathematical ideas for processes in mathematics: number, measures, shape, space and data that are essential foundations for further mathematical thinking.

We have correlated focus activities from *Number, Pattern and Calculating 5* and *Geometry, Measurement and Statistics 5* to the Mathematics and the New Zealand Curriculum to support teachers in their planning. These correlations will be useful whether schools choose to follow the focus activities in the order outlined in the Teaching Resource Handbook, or prefer to dip in and out of the teaching materials for different topics.

The **Numicon Approach** fulfils the curriculum to students in a knowledge-rich environment where the concepts are taught alongside the processes of being a mathematician. Where you see references to processes, these are embedded in the learning experiences every week:

- The use of representations to communicate with self and others
- Connections within maths and the daily life of the students
- Investigations
- Generalising
- Explain and justify

Included in the Numicon programme is the strong connection with the language of maths. Every week teachers are provided with a list of words and terms to use in their teaching through meaning and usage. There is an expectation that these words are used by the teachers, displayed on walls. Students are encouraged to use these words and terms with confidence. Every week an assessment goal is the 'use of the words and terms in conversation and effectively in discussion'. For example: Numicon 5 Calculating 9: Division with remainders

Terms for children to use
shared equally, equal groups of ... , dividing sentence, approximately equal, check, tables facts, multiples, factors, divide, divided by ... , divisible by ... , remainder, fraction, equivalent fraction, improper fraction, mixed number, decimal, divisor, dividend, quotient, exchanging, sharing, groups, inverse, partition

Teaching Materials Featured in this Correlation:

Number, Pattern and Calculating 4 Teaching Pack ISBN 978-0-19-838984-2
Geometry, Measurement and Statistics 4 Teaching Pack ISBN 978-0-19-838985-9
Number, Pattern and Calculating 5 Teaching Pack ISBN 978-0-19-848971-9
Geometry, Measurement and Statistics 5 Teaching Pack ISBN 978-0-19-848972-6
Number, Pattern and Calculating 6 Teaching Pack ISBN 978-0-19-830490-6
Geometry, Measurement and Statistics 6 Teaching Pack ISBN 978-0-19-830491-3

2024 Curriculum Phase 3 Year 7 with Numicon 5

Abbreviations: Numicon (N) Pattern & Algebra (P&A) Numbers and the Number System, (NNS), Calculating (C), Geometry (G), Measurement (M), Statistics and Probability (*throughout all the strands*) Preparing for Formal Testing (PFT)

Number **Mātauranga tau | Number structure** identify, read, write, compare, and order whole numbers using powers of 10 (e.g., 10,000 = 10^4)	**NNS 1** **Powers - exponents to write**
find the highest common factor (HCF) of two numbers under 100, and find the least common multiple (LCM) of two numbers under 10	**P & A 3**
use exponents to notate repeated multiplication, and identify square roots of square numbers up to at least 100	**P & A 4** Square roots **Exponents – will write this**
	NNS 5 Introduction to negative numbers Number lines – vertical and horizontal
use the mathematical processes to: – connect with divisibility rules, simplifying fractions, area, and volume – generalise conjectures about prime or composite numbers – investigate appropriate situations	**The mathematical processes listed (see left) are embedded in the activities above and for all sections described below, to the end of the document.**
Operations use rounding and estimation to predict and to check the reasonableness of calculations	**NNS 4**
round whole numbers to any specified multiple of powers of 10, and round decimals to the nearest tenth, hundredth, or whole number	**NNS 3, 4** Powers of 10 – Will write this
divide whole numbers by 1- or 2-digit divisors (e.g., 327 ÷ 5 = 65.4 or 65 .25)	**Numicon 4 CAL 13** **CAL 8, 9**
use the order of operations rule GEMA	**P& A 5** **CAL 6, 16**
order, compare, add, and subtract integers using tools	**Numicon 4 NNS 4** **NNS 5**

use the mathematical processes to: – investigate situations where integers are used (e.g., temperature, altitude, profit and loss) – explain and justify findings using estimation, and checking using inverse operations	**The mathematical processes listed (see left) are embedded in the activities above and for all sections described below, to the end of the document.**
Rational Number identify, read, write, and represent fractions, decimals (to three places), and percentages	**NNS 2, 4, 7**
compare, order, and convert between fractions, decimals (to three places), and percentages	**NNS 3, 7, 11**
multiply and divide numbers by powers of 10	**Will have to write this**
find equivalent fractions, simplify fractions, and convert between improper fractions and mixed numbers	**NNS 2** **CAL 4**
multiply fractions and decimals by whole numbers, and find a percentage of a whole number	**CAL 4, 8, 11, 12, 13, 14, 15**
find a whole amount, given a simple fraction or percentage (e.g., '75% is $45, what is the original amount?')	
add and subtract fractions with different denominators up to tenths (e.g., 3/4 + 1/3	**CAL 15**
add, subtract, and multiply decimals, with an emphasis on estimating before calculating	**CAL 12, 13, 14**
use proportional reasoning to explore relationships between quantities (e.g., 'If there are 3 red for every 7 blue balls, how many balls are there altogether when there are 18 red balls?')	**CAL 10**
use the mathematical processes to: – connect benchmarks (fractions, decimals, and percentages) and decimal operations with whole-number place values and operations – connect decimals with measuring – investigate HCFs and LCMs, the effect of multiplying and dividing decimals, situations where decimals are used and compared (e.g., sporting events), and proportional reasoning – explain and justify equivalence and which fraction is larger	
Financial Maths calculate costs, and change for any amount of money	**CAL 1, 5, 10, 13, 16** **Measurement 7**
calculate the percentage discounts of whole dollar amounts (e.g., 'What is 35% of $180?')	**CAL 11**
use the mathematical processes to: – connect negative numbers with debt – investigate practical financial decisions and statistics in the media about growth or loss.	
Taurangi | Algebra **Generalising Number Properties** explore multiplicative inverses (a number and its reciprocal) in multiplication	**P & A 2**
explore additive inverses (pairs of opposites) in the addition and subtraction of positive and negative numbers (e.g., -6 + 8 = -6 + 6 + 2)	**NNS 5**
recall multiplication facts to at least 10 × 10 and identify and describe the divisibility rules for 2, 3, 5, 9, and 10	**P & A 4**
describe and use the commutative, distributive, and associative properties of operations (e.g., O × _ = _ × O)	**Numicon 1 - 4** Commutative & Associative properties **Cal 8** Distributive property

use the mathematical processes to: 1 represent algebraic expressions and equations using correct vocabulary and notation (e.g., 3 × b = 3b) 2 connect prime and composite numbers with factors, multiples, and divisibility rules 3 generalise relationships between positive and negative integers using the commutative, associate, and distributive properties of numbers 4 investigate appropriate situations	Mathematical processes: **1 P & A 5** Recording with brackets **2 P & A 3** Prime, composites, factors, multiples **3 Will write this** ?
Equations and Relationships form and solve 1-step linear equations (e.g., t + 7 = 12; 2s = 14)	to write
find the value of an expression or formula given the values of variables (e.g., calculate w + 12 when w = 4)	to write
identify the constant rate of change and fixed value for a linear pattern, writing the equation using variables and algebraic notation to represent the rule, and using the rule to make predictions	**Cal 10** Simple rates Numicon 6 to write
Algorithmic Thinking create, test, and revise algorithms involving a sequence of steps and decisions	**P & A 2**
Measurement **Measuring** estimate and then measure length, area, volume, capacity, mass (weight), temperature, data storage, time, and angle, using appropriate metric units	**Measurement 1, 2, 4, 5** **Measurement 7** **data storage, using appropriate metric units**
select and use an appropriate base measure (e.g., metre, gram, litre) within the metric system, along with a prefix (e.g., kilo, centi) to show the size of units	**Measurement 1, 2, 4, 5**
convert between metric units of length, mass (weight), and capacity, using whole numbers and decimals to express parts of a unit (e.g., 724g = 0.724kg)	**CAL 10**
find distance given speed and time	
	Measurement 6 Scale drawing and the powers of 10
Perimeter, Area, and Volume calculate the perimeter and area of compound shapes composed of triangles and rectangles	**Measurement 3, 4** Triangles – Numicon 6
use the mathematical processes to: – generalise the formulae for finding the area of triangles and volume of triangular prisms – investigate practical contexts for finding perimeter, area, and volume	Numicon 5 and 6
read, interpret, and use timetables and charts that present measurement information	**Measurement 2** including positive and negative measurements
convert between units of time and solve duration problems that involve fractions of time	**Measurement 2**
use the mathematical processes to: – generalise units of time using base-60	

– investigate the duration of time in situations such as developing event schedules or planning journeys.	
Geometry **Shapes** classify shapes based on their properties, and name the resulting classes of shapes (e.g., triangles, pyramids)	**Geometry 3**
identify and describe angles at a point, angles on a straight line, and vertically opposite angles	**Geometry 1, 3** **and vertically opposite angles**
use the mathematical processes to: – generalise using angle rules to find unknown angles – investigate diagonals and angles of polygons – explain and justify classifications using flowcharts, Venn diagrams, and tables	
Spatial Reasoning visualise, construct, and draw plan views for front, back, left, right, and top views of 3D shapes, using cube models, digital tools, and grid paper	
transform 2D shapes, including composite shapes, by resizing by a whole number or unit fraction of less than one	**Geometry 2** **Resizing – will write this**
use the mathematical processes to: – investigate the meaning of kowhaiwhai patterns and other symbols from te ao Māori, and describe the use of transformations in these patterns – explain which properties of a shape will be affected by a given transformation	**Will write this**
Pathways interpret and communicate the location of positions and pathways using coordinates, angle measures, and the 8 main and halfway compass points (e.g., 45° E from N is NE)	**Numicon 3 compass points** **Numicon 4** **Geometry 4 Reading and plotting positions using co-ordinates** **Geometry 1, 2**
use the mathematical processes to: – connect map scales to proportional reasoning – connect angles and using a protractor with compass points – investigate the most efficient route between two destinations.	
Statistics **Problem** investigate, using multivariate datasets, summary, comparison, time-series, and relationship situations for paired categorical data by: – posing investigative questions about local community matters – making predictions or assertions about expected findings	
use the statistical processes to: – represent summary, comparison, relationship, and time-series investigative questions – investigate a broad area of interest before fine-tuning a specific investigative question	
Plan plan how to collect or source data to answer investigative questions, including – determining or identifying the variables needed – planning how to collect data for each variable (e.g., how to measure them when collecting) or finding out how provided data was collected – identifying the group of interest or who the data was collected from	**Measurement 2**

– building awareness of ethical practices by strategic questioning of data collection methods	
use the statistical processes to: – represent using a diagram who, what, and how to measure – investigate appropriate situations – explain and justify variables and groups of interest when working with secondary data	
Data collect data, including – checking for errors, following up and correcting them when possible – creating data dictionaries that include information for others about the context	**Measurement 2**
use the statistical processes to: – represent data using a range of tools (e.g., spreadsheets, recording sheets) – investigate secondary data – explain errors in data and justify why they are errors	
Analysis create and describe data visualisations for summary, comparison, relationships (paired categorical), and timeseries investigations, including features and context in descriptions of distributions	**Measurement 2**
– explain and justify patterns, trends, and features of data visualisations	
Conclusion communicate findings in context to answer an investigative question, using evidence from analysis and comparing findings to initial predictions or assertions and existing knowledge of the world	**Measurement 2**
use the statistical processes to: – connect statements with data visualisations to answer an investigative question – investigate appropriate situations – explain findings, and justify initial predictions or assertions given the findings	
Statistical Literacy examine the findings of others to check if their claims or statements are supported by the data visualisations they use	**Measurement 2**
use the statistical processes to explain and justify critiques of data visualisations and collection methods.	
Probability **Probability Investigations** plan and conduct probability experiments for chance-based situations, including undertaking a large number of trials using technology, by: – posing investigative questions – identifying outcomes for the investigative question posed and anticipating what might happen – deciding on the number of trials, the tools to be used, and the recording method – collecting and recording data – creating data visualisations for the distribution of observed outcomes and (year 8) for all possible outcomes for theoretical probability models where they exist – describing what these visualisations show – finding the probability estimates for the different outcomes – proposing possible theoretical outcomes and associated probabilities for situations where no theoretical model exists – identifying similarities and differences between their findings and those of others – reflecting on anticipated outcomes	

– identifying similarities and differences between findings from probability experiments and associated theoretical probabilities, as appropriate	
Critical Thinking in Probability agree or disagree with others' conclusions by interrogating their probability experiments	
›use the statistical processes to: – represent outcomes using systematic approaches and technology – connect probabilities with proportional reasoning, fractions, and percentages – investigate games of chance, patterns in possible outcomes, and theoretical and experimental distributions – explain and justify probability estimates and claims about chance-based situations.	