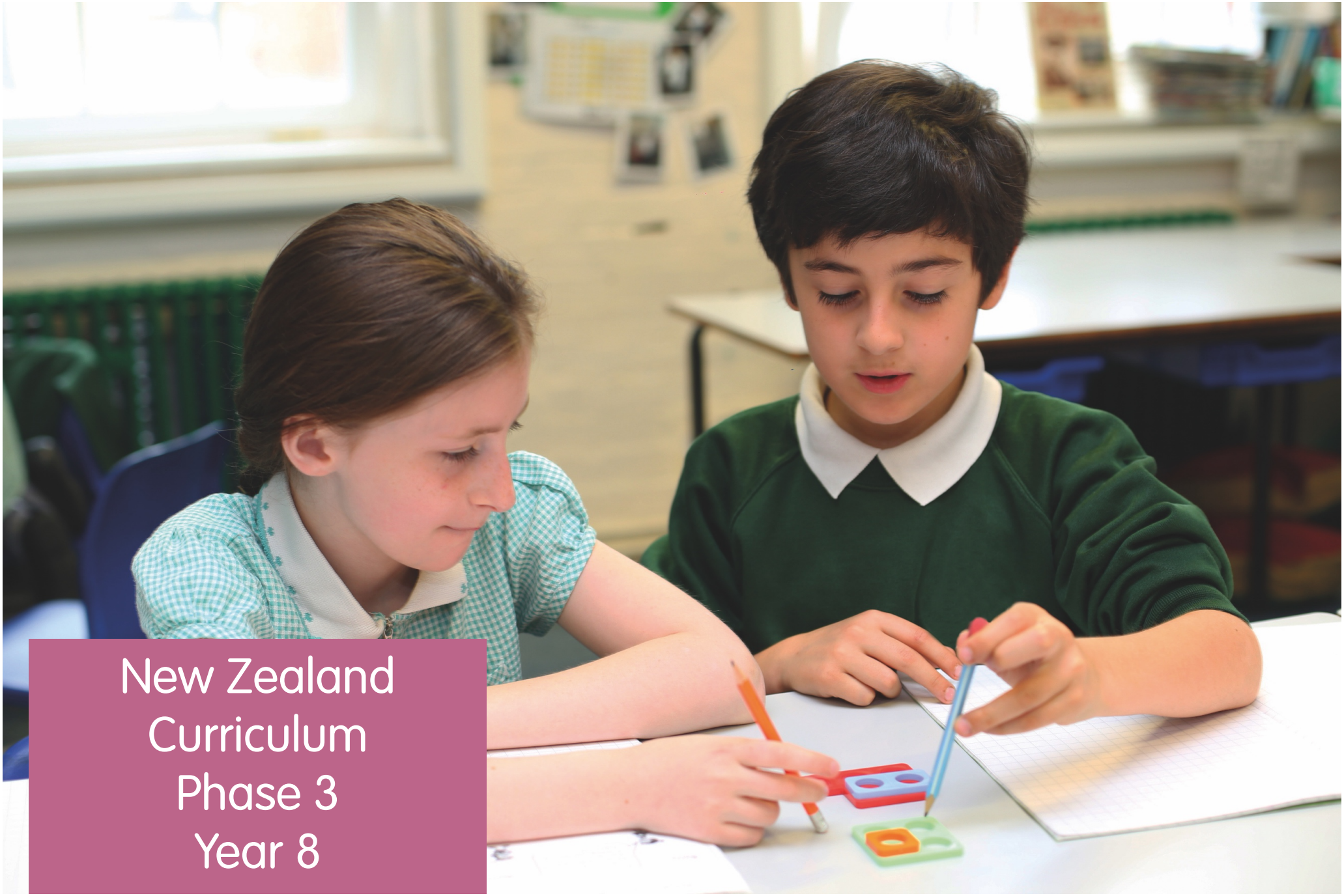

# New Zealand Curriculum Phase 3 Year 8

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 6 Calculating 1: Adding and subtracting negative numbers in context, and large numbers.

Terms for children to use
negative, positive, minus, plus, above/below zero, direction, size, magnitude, data, exact, approximate, rough, typical, vary, interval, difference, infinity, total, sum, bridging, partitioning, rounding, adjusting, complements, equivalence, finding the difference, taking away, unknown

**Teaching Materials Featured in this Correlation:**

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 8 with Numicon 6

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** | **Numicon 6** |
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| **Mātauranga tau \| Number structure**<br>identify, read, write, compare, and order whole numbers and decimals using powers of 10 (e.g., 0.01 = 1 100 = $10^{-2}$) | **Numbers and the Number system (NNS) 1**<br>**Exponent symbol.**<br>**CAL 9** |
| use prime factorisation to represent a number and to find the HCF of two numbers | **P & A 1** |
| identify prime and composite numbers up to at least 100 identify cube numbers up to at least 125 | **Numicon 5 P & A 3**<br>**Numicon 6 P & A 4**<br>**Numicon 5 P & A 4** Cube numbers |
| use the mathematical processes to:<br>– connect with divisibility rules, simplifying fractions, area, and volume<br>– generalise conjectures about prime or composite numbers – investigate appropriate situations | |
| **Operations**<br>use rounding and estimation (including benchmarks) to predict and to check the reasonableness of calculations | **CAL 3, 9** |
| divide whole numbers (e.g., 327 ÷ 15 = 21.8 or 21 4/5) | **CAL 2, 4, 9, 10** |
| use the order of operations rule GEMA | **CAL 6, 7, 13**<br>**Preparing for formal testing 3** |
| order, compare, add, and subtract integers | **Numicon 5 NNS 5**<br>**Numicon 6 NNS 1** |
| use the mathematical processes to:<br>– investigate situations where integers are used (e.g., temperature, altitude, profit and loss)<br>– explain and justify findings using estimation, and checking using inverse operations | |
| **Rational Number**<br>identify, read, write, and represent fractions, decimals, and percentages | **NNS 2** |
| compare, order, and convert between fractions, decimals, and percentages | **NNS 2** |
| multiply and divide numbers by powers of 10 | **CAL 9 Multiplying** |
| find equivalent fractions, simplify fractions, and convert between improper fractions and mixed numbers | **Numicon 5 NNS2**<br>Improper fractions and mixed Number |

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| | **NNS 2**<br>**Cal 8** |
| multiply fractions and decimals by whole numbers, and find a percentage of a whole number | **CAL 2, 5, 9, 10** |
| find a whole amount, given a simple fraction or percentage (e.g., '75% is $45, what is the original amount?') | **Will write this** |
| add and subtract fractions with different denominators by using equivalent fractions | **CAL 11, 12** |
| add, subtract, and multiply decimals, with an emphasis on estimating before calculating | **CAL 9** |
| use proportional reasoning to share in unequal proportions (e.g., 'We have 100 stickers to share. for every 1 sticker I get, you get 3 stickers. How many do we each get?') | **CAL 7** |
| use the mathematical processes to:<br>– connect benchmarks (fractions, decimals, and percentages) and decimal operations with whole-number place values and operations<br>– connect decimals with measuring<br>– 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<br>– explain and justify equivalence and which fraction is larger | |
| **Financial Maths**<br>create and compare weekly, monthly, and yearly finance plans (e.g., saving plans, phone plans, budgets, and 'buy now, pay later' services) | **Investigations 5**<br>**Investigations 6** |
| calculate percentage discounts | **CAL 5** |
| use the mathematical processes to:<br>– connect negative numbers with debt<br>– investigate practical financial decisions and statistics in the media about growth or loss. | |
| **Taurangi \| Algebra**<br>**Generalising Number Properties**<br>use commutative, associative, identity, and inverse properties with expressions, including those with negative numbers | **P & A 3, 4**<br>**CAL 1, 2** |
| identify and describe the properties of prime and composite numbers and explore divisibility rules | **P & A 1, 4** |
| simplify algebraic expressions involving sums, products, and differences, including by expanding single brackets expressions using the distributive property (e.g., 2(x + 3) + 1 = 2x + 6 + 1 = 2x + 7) | **Will have to write this** |
| use the mathematical processes to:<br>- represent algebraic expressions and equations using correct vocabulary and notation (e.g., 3 × b = 3b)<br>- connect prime and composite numbers with factors, multiples, and divisibility rules<br>- generalise relationships between positive and negative integers using the commutative, associate, and distributive properties of numbers<br>- investigate appropriate situations | **P & A 1, 3, 4**<br>**CAL 1, 2** |
| **Equations and Relationships**<br>form and solve 1- or 2-step linear equations (e.g., 5s – 3 = 17) | **Will have to write this** |
| find the value of an expression or formula given the values of variables | **P & A 2, 3, 4** |
| determine if a pattern is linear and, if it is, write the equation for the pattern and use the equation | **P & A 2, 4** |
| use the mathematical processes to:<br>– connect to measurement formulae<br>– generalise a rule for a pattern and use this to justify a prediction of a term | |

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| – investigate the history and use of growing patterns in tukutuku and other well-known patterns (e.g., the Fibonacci sequence) | |
| **Algorithmic Thinking**<br>create, test, revise, and use algorithms to identify, interpret, and explain patterns | **P & A 2, 3, 4** |
| use the formula function of a spreadsheet to explore the effect of changing the value of a variable (e.g., hourly wages) on the results (i.e., cell values) | **P & A 3, 4**<br>SPREADSHEET – will write this |
| use the mathematical processes to connect algorithms with methods for solving an operation. | **CAL 13** |
| **Measurement**<br>**Measuring**<br>estimate and then measure length, area, volume, capacity, mass (weight), temperature, data storage, time, and angle, using appropriate metric units | **Measurement 2, 3, 4**<br>**CAL 9 Multiplying**<br>**Investigating 1**<br>**Write -**<br>**data storage,**<br>**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 | **Numicon 5**<br>**Measurement 1, 2, 4, 5, 7** |
| convert between metric measurement units, including square units | **Measurement 3**<br>**Square units** |
| find distance given speed and time, or time given distance and speed | **Measurement 1**<br>**P & A 2** |
| use the mathematical processes to:<br>– generalise equivalent measurements (e.g., 2.05L = 2050mL)<br>– connect measurement conversions with multiplying and dividing by powers of 10<br>– investigate practical measurement situations, including reading tools with scales<br>– explain which measurement tools and units are appropriate in a given situation | |
| **Perimeter, Area, and Volume**<br>calculate the volume of triangular prisms and shapes composed of rectangular prisms | **Measurement 2, 3** |
| 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 | |
| **Time**<br>read, interpret, and use timetables and charts that present measurement information | **Measurement 1** |
| 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**<br>**Shapes**<br>describe triangles, quadrilaterals, and other polygons in relation to their side, diagonal, and angle properties | **Numicon 5 Geometry 1**<br>**Geometry 1, 3**<br>**Measurement 2** |
| reason about unknown angles in situations involving angles at a point, angles on a straight line, vertically opposite angles, interior angles of triangles, and polygons | **Numicon 5 Geometry 1** |
| use the mathematical processes to:<br>– generalise using angle rules to find unknown angles<br>– investigate diagonals and angles of polygons<br>– explain and justify classifications using flowcharts, Venn diagrams, and tables | **Numicon 4 - 6** |

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| **Spatial Reasoning**<br>visualise and draw nets for prisms with a fixed cross section | **Measurement 3**<br>**Prism – cross section – will write this** |
| recognise the invariant properties of 2D and 3D shapes under different transformations | **Measurement 2**<br>**Geometry 3** |
| use the mathematical processes to:<br>– investigate the meaning of kowhaiwhai patterns and other symbols from te ao Māori, and describe the use of transformations in these patterns<br>– explain which properties of a shape will be affected by a given transformation | **Will write this** |
| **Pathways**<br>use map scales, compass points, distance, and turn to interpret and communicate positions and pathways in coordinate systems and grid reference systems | **Numicon 4**<br>**Numicon 5 Geometry 1** |
| use the mathematical processes to:<br>– connect map scales to proportional reasoning<br>– connect angles and using a protractor with compass points<br>– investigate the most efficient route between two destinations | |
| **Tauanga \| Statistics**<br>**Problem**<br>investigate, using multivariate datasets, summary, comparison, time-series, and relationship situations for paired categorical data by:<br>– posing investigative questions about local community matters<br>– making predictions or assertions about expected findings | **Measurement 1** |
| 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**<br>plan how to collect or source data to answer investigative questions, including<br>– determining or identifying the variables needed<br>– 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<br>– building awareness of ethical practices by strategic questioning of data collection methods | **Measurement** 1 |
| **Data**<br>source ready-to-use data, and provide information about the variables using provided data dictionaries | |
| 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**<br>create and describe data visualisations for summary, comparison, relationships, and time-series investigations, using multiple visualisations to provide different views of the data and including features and context in descriptions of distributions | **Measurement 1**<br>**P & A 1** |
| use the statistical processes to: – represent data using dot plots, bar graphs, frequency tables, time-series graphs, two-way tables or graphs, scatter plots, fractions, proportions, and percentages – investigate how different data visualisations show different features of data and give different information – explain and justify patterns, trends, and features of data visualisations | **CAL 5** |
| **Conclusion**<br>communicate findings in context to answer an investigative question, using evidence from analysis, considering possible explanations for findings, and comparing findings to initial predictions or assertions and existing knowledge of the world | |

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| 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**<br>examine the data-collection methods, data visualisations, and findings of others' statistical investigations to see if their claims are reasonable | |
| use the statistical processes to explain and justify critiques of data visualisations and collection methods. | |
| **Tūponotanga \| Probability**<br>**Probability Investigations**<br>plan and conduct probability experiments for chance-based situations, including undertaking a large number of trials using technology, by:<br>– posing investigative questions<br>– 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<br>– creating data visualisations for the distribution of observed outcomes and (year 8) for all possible outcomes for theoretical probability models where they exist<br>– describing what these visualisations show<br>– finding the probability estimates for the different outcomes<br>– proposing possible theoretical outcomes and associated probabilities for situations where no theoretical model exists<br>– identifying similarities and differences between their findings and those of others<br>– reflecting on anticipated outcomes<br>– identifying similarities and differences between findings from probability experiments and associated theoretical probabilities, as appropriate | **Investigations 3**<br>**P & A 3, 4**<br>• Can explain the general relationship between an 'input' (x) and an 'output' (y) for a particular function (e.g. for a function described by y = 3x, y is always three times x, x is always one third of y). |
| **Critical Thinking in Probability**<br>agree or disagree with others' conclusions by interrogating their probability experiments | |
| agree with or challenge claims and identify misconceptions in relation to chance-based situations | |
| 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. | |