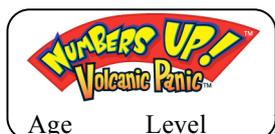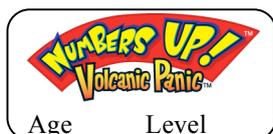# NZ Mathematics Level 1-Yr 9 Curriculum Objectives Addressed Within Numbers Up! Volcanic Panic
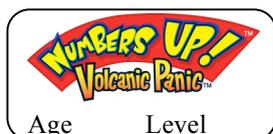
Age	Level	NZ Level	Number & Computation
4-7	1-11	Level 1	**Number** **Exploring Number** Count, order and compare numbers up to 5, then later to 9, and then up to 20. Make sets up to 5 (then 9, then 20). Explore the number system from zero to 99 Rote count from zero to 99 and beyond. Rote count to 99, count forwards and backwards to and from 99 in 1s, 2s, 5s, and 10s. Explore the idea of place value through comparing number patterns in 10s. Explore the meaning of digits in any 2-digit whole number. Explore the idea of a fraction. Find halves and quarters of everyday objects, common shapes and sets of objects. **Exploring Computation and Estimation** Develop number sense by exploring estimation and computation, in the context of the world around them, using concrete examples and mental strategies. Join two or more sets with a combined total of up to 9, later 20, (later 50, later up to 100). Separate a set of 9 objects (later up to 20 objects) into two or more parts. Develop mental strategies for adding numbers of objects up to a total of 9 and later 20, (later up to 100). Develop mental strategies for subtracting numbers of objects from up to 20 (later up to 100). Make sensible estimates and check the reasonableness of answers.
7 - 9	12 - 17	Level 2	**Exploring Number** Read any 3-digit whole number. Explain the meaning of the digits in 2- or 3-digit whole numbers. Order any set of three or more whole numbers (up to 99). Solve comparison problems. Solve story problems which involve halves, quarters, thirds and fifths. Count, record, order and compare numbers. Investigate number patterns. Explore the number system from 0 to 1 000 and beyond. Explore place value. Investigate odd and even numbers. Investigate ways to rename numbers.

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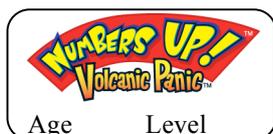
Age	Level	NZ Level	Number & Computation
			Explore number patterns showing multiples. Explore fractions (halves, quarters, thirds, fifths). **Exploring Computation and Estimation** Explore estimation and computation in the context of everyday life. Work with numbers 0 – 1 000 and beyond. Perform additions and subtractions. Investigate the special properties of 0, under addition and subtraction, and of 1, under multiplication and division. Use strategies to help the memorising of the addition, subtraction, multiplication and division facts. Develop instant recall of basic addition and subtraction facts. Use strategies for estimating and checking the reasonableness of addition, subtraction, multiplication and division calculations. Solve comparison problems in a story context. Add and subtract money and measures. Explore division as sharing. Solve story problems (including those involving money and measurements) which involve combinations of the four operations. Recognise that taking a fraction of a set is a sharing (dividing) operation.
9 - 11	18 - 21	Level 3	**Exploring Number** Explain the meaning of the digits in any whole number. Explain the meaning of the digits in decimal numbers up to three decimal places. Order decimals with up to three decimal places. Explore the use of fractions and decimals in society. Develop meaning for decimal place values. Writing decimals in words and symbols. Explore number patterns which involve both whole numbers and decimals. Investigate possible ways of renaming using decimals. **Exploring Computation and Estimation** Maintain addition and subtraction facts. Demonstrate the instant recall of basic multiplication facts. Work with whole numbers and decimals. Use mental methods to add and subtract numbers. Make sensible estimates and check the reasonableness of answers. Solve story problems involving one or more of the four basic arithmetic operations. Use mental methods to find fractions of whole number and decimal amounts (including money and measurement).

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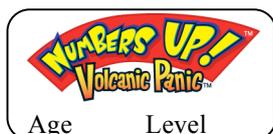
Age	Level	NZ Level	Number & Computation
11-13	19 - 23	Level 4	**Exploring Number** Explain the meaning of negative numbers. Explain the meaning and evaluate powers of whole numbers. Find fractions equivalent to one given. Express a fraction as a decimal and vice versa. Express a decimal as a percentage and vice versa. Express quantities as fractions or percentages of a whole. **Exploring Computation and Estimation** Make sensible estimates and check the reasonableness of answers. Solve problems involving decimal multiplication and division. Find a given fraction or percentage of a quantity. Explain satisfactory algorithms for addition, subtraction and multiplication. Demonstrate knowledge of the conventions for order of operations. Use money and measurement to explore sensible rounding techniques.
13 - 15	24 - 26	Level 5	**Exploring Number** Convert numbers expressed in standard form to ordinary form and vice versa. Explore the use of standard form in practical contexts. Round numbers sensibly. Express numbers in index form. Explore the use of ration in everyday contexts. Develop meaning for ratio by comparing two like quantities. Investigate equivalent ratios. Record ratios as $\frac{b}{d}$ and *a:b* **Exploring Computation** Make sensible estimates and check the reasonableness of results. Solve practical problems involving decimals and percentages. Solve problems involving positive and negative numbers. Express one quantity as a percentage of another. Increase and decrease quantities by given percentages, including mark-up, discount and GST. Share quantities in given ratios. Investigate profit and loss related to cost price and selling price. Explore and use rounding techniques, including significant figure and decimal place rounding.

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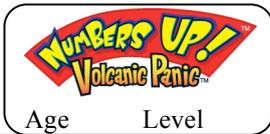
Age	Level	NZ Level	Number & Computation
13-14	23-24	Year 8	**Numbers and the number system**
			Place value, ordering and rounding
			Read and write positive integer powers of 10; multiply and divide integers and decimals by 0.1, 0.01
			Order decimals
			Round positive numbers to any given power of 10; round decimals to the nearest whole number or to one or two decimal places
			Integers, powers and roots
			Add, subtract, multiply and divide integers
			Recognise and use multiples, factors (divisors), common factor, highest common factor and lowest common multiple in simple cases, and primes
			Use squares, positive and negative square roots, cubes and cube roots, and index notation for small positive integer powers
			Fractions, decimals, percentages, ratio and proportion
			Order fractions
			Add and subtract fractions
			Calculate fractions of quantities
			Multiply and divide an integer by a fraction
			Express one number as a percentage of another
			Use the equivalence of fractions, decimals and percentages to compare proportions
			Calculate percentages, and find the outcome of a given percentage increase or decrease
			Reduce a ratio to its simplest form, including ratio expressed in different units
			Divide a quantity into two or more parts in a given ratio
			Use the unitary method to solve simple word problems involving ratio and direct proportion
			Calculations
			Understand addition and subtraction of fractions and integers, and multiplication and division of integers
			Use the laws of arithmetic and inverse operations
			Recall known facts, including fraction to decimal conversions
			Use known facts to derive unknown facts, including products involving numbers such as 0.7 and 6, and 0.03 and 8
			Consolidate and extend mental methods of calculation, working with decimals, fractions and percentages, squares and square roots, cubes and cube roots
			Solve word problems mentally
			Make estimates and approximations of calculations

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Age	Level	NZ Level	Number & Computation
14-15	25-26	Year 9	**Numbers and the number system** **Place value, ordering and rounding** Extend knowledge of integer powers of 10 Multiply and divide by any integer power of 10 Begin to write numbers in Standard Form Round numbers to the nearest whole number, or to one, two or three decimal places Round numbers to a given number of significant figures; understand upper and lower bounds **Integers, powers and roots** Use index notation for integer powers and simple instances of the index laws Know and use the index laws for multiplication and division of positive integer powers Begin to extend understanding of index notation to negative and fractional powers **Fractions, decimals, percentages, ratio and proportion** Recognise when fractions or percentages are needed to compare proportions Solve problems involving percentage changes Use proportional reasoning to solve a problem, choosing the correct number to take as 100% or as a whole Understand the implications of enlargement for area and volume Compare two ratios Interpret and use ratio in a range of contexts, including solving word problems **Calculations** Understand the effects of multiplying and dividing by numbers between 0 and 1 Use the laws of arithmetic and inverse operations Recognise and use reciprocals Understand the order of precedence and the effect of powers Use known facts to derive unknown facts Extend mental methods of calculation, working with decimals, fractions, percentages, factors, powers and roots. Solve word problems mentally Make estimates and approximations of calculations Use standard column procedures to add and subtract integers and decimals of any size, including a mixture of large and small numbers with differing numbers of decimal places

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Age	Level	NZ Level	Number & Computation
14-15	25-26	Year 9 Able pupils	**Numbers and the number system** **Place value, ordering and rounding** Write numbers in standard form Understand upper and lower bounds; round numbers to three decimal places and a given number of significant figures **Integers, powers and roots** Know and use the index laws for multiplication and division of positive integer powers Begin to extend understanding of index notation to negative and fractional powers **Fractions, decimals, percentages, ratio and proportion** **Understand the implications of enlargement for area and volume**