The Wilkie Way

Newsletter December 2024

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Digging into the Know Section of the Refreshed Curriculum

This section of the curriculum is very important as it describes the meaningful and important mathematical **concepts and procedures** through which students develop understanding of the big ideas.

It is important to keep this section in mind in order to make connections between the statements in the teaching sequence and have a clear idea of the bigger picture of understanding.

Looking at Number:
Number focuses on the study of numerical concepts. People use numbers to represent quantities, estimate, and measure. We perform operations on numbers to calculate or compare. Throughout history, different number systems have been developed, reflecting practical and social needs.

Looking at Algebra:
Algebra focuses on making and using generalisations to reason mathematically. It allows us to identify patterns and underlying mathematical relationships. These generalisations, patterns, and relationships can be represented and communicated using diagrams, graphs and symbols (including variables).
The algebra we use today was created and refined over thousands of years.

By the end of Phase One (Years 0 - 3)
Students know that our number system is base 10, with ten digit symbols. The place value of a digit in a number depends on its position; as we move to the left, each column is worth ten times more, with zero used as a placeholder. Students know that they can subitise (recognise without counting) patterns to support estimations and calculations. They know that numbers can be partitioned and recombined in different ways. Addition is putting parts together to find a total or whole. Subtraction takes parts away from a whole; it is also the difference between numbers. Multiplication and division involve recognising and working with equal groups and how many are in each group, the number of groups, and the total amount.
Students come to know that fractions are numbers that can be represented using words, pictures, or symbols. When fractions are represented symbolically, the bottom number (the denominator) shows how many pieces a whole has been equally split into, and the top number (the numerator) shows how many of those parts the fraction represents. Fractions show parts of a whole region, set of objects, or measurement.

Historical point

The concept of a symbol for zero developed in India between the fifth and eighth centuries as a means of representing "none of something" in the way the symbol "5" represents five of something.
Prior to the symbol for zero mathematicians left a blank space in their calculations.
It was the acceptance of zero as a number that marked the development of a number system based on a place value.

Students know that patterns are made up of elements, including numeric and spatial elements, in a sequence governed by a rule. Repeating patterns have a unit of repeat, growing patterns can increase or decrease.
The equals sign is relational in that it shows the two sides of an equation represent the same quantity. Students also know that an algorithm is a set of step by step instructions for completing a task or solving a problem.

By the end of Phase Two (Years 4 - 6)

Students know that in our number system each place value is a power of 10, and this continues infinitely. To the right, the system continues past the ones column to create decimals (tenths, hundredths, thousandths); the decimal point marks the column immediately to the right as the tenths column. Estimation and rounding support checking the reasonableness of solutions of operations involving whole numbers, fractions, and decimals. Students know that to evaluate expressions that have more than one operation, operations inside brackets (i.e., grouped together) are done first. If there are multiplication and division, these are then done in left-to-right order; finally, addition and subtraction are also done in left-to-right order. Division can be partitive (the number of shares is known) or quotitive (the size of the shares is known).

Students come to recognise the properties of number operations. The additive identity is 0 (e.g., 3 + 0 = 3) and the multiplicative identity is 1 (e.g., 5 × 1 = 5). The commutative property (e.g., 3 × 5 = 5 × 3) and associative property (e.g., 3 × (4 × 6) = (3 × 4) × 6) apply to addition and multiplication but not to subtraction and division. The distributive property (e.g., 2 × (6 – 4) = 2 × 6 – 2 × 4) applies to multiplication over addition and subtraction.

Students also come to know that fractions can result from one number divided by another (the quotient), operate on quantities, and be larger than 1. Improper fractions can also be written as a mixed number, represented as a whole number and a fraction, combined with a hidden addition. In simplified fractions, the numerator and denominator have no common factors; if the denominator of a simplified fraction is 1, then it can be written as a whole number. Decimals are fractions that have powers of 10 as their denominators, and they can be written as numbers using a decimal point. A percentage is a fraction with a denominator of 100

Students know that the equal (=) and inequality (< , >) signs show relationships, and that applying the same operations to both sides of an equation preserves the balance of the equation. Students know that in a pattern, the relationship between the ordinal position and its corresponding element can be used for finding the pattern or rule. Any element can be found by knowing its position, and any position can be found from its corresponding element. Tables, and XY graphs provide a way of organising the positions and elements of a pattern to reveal relationships or rules. An algorithm is an ordered list of instructions for solving a problem.

Historical Point

Up until 1975 there was an alternative number system in existence which used millions as the place value pattern.
US and France used a billion as a thousand million, while Britain and the British Empire and Commonwealth (including NZ) used a billion as a million million.
The UK treasury adopted the US billion which is the place value pattern we use today.

By end of Phase Three

Students know that some numbers have special properties (e.g., primes, composites, squares, square roots, cubes). A fraction can describe a proportional relationship between two amounts. Every fraction can be represented by an infinite set of equivalent fractions that occupy the same point on the number line. Multiplying a fraction by an equivalent form of 1, such as 3/3, results in an equivalent fraction that can be useful for comparing, adding, and subtracting fractions. Decimals continue the place-value system using negative powers of ten. They can be terminating, repeating and infinite, or non-repeating and infinite.

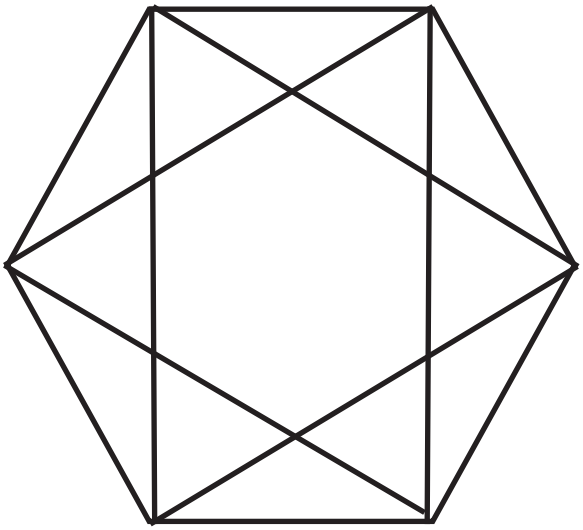
Students come to know that integers are positive and negative whole numbers and include zero. To compare relative magnitude, integers, fractions, and decimals can be represented on a number line. There are real-life situations described by quantities less than zero (e.g., temperature, below sea level, debt), and these quantities can be operated on.

Historical Point

The base 10 number system was invented just over 2000 years ago but the decimal part of the number system was only invented about 500 years ago by a Minister of Finance realising the need for accurate accounting procedures. He found fractional calculations cumbersome so he invented a system that was precise and tidy.

Students also come to know that when evaluating or forming expressions, the order of operations is important. Operations inside brackets (i.e., grouped together) are done first, then powers or exponents. If there are multiplication and division, these are then done in left-to-right order; finally, addition and subtraction are also done in left-to-right order. Division can result in a remainder expressed as a whole number, fraction, or decimal.
Students know that the inverse property applies to addition and multiplication. Inequalities can also include 'or equal to' (≤, ≥) to show a relationship that allows for the possibility of equality. In algebra, a variable can be used to represent an unknown number, a quantity that can vary or change (e.g., y= 3x + 4; A = bh), or a specific unknown value to be solved for (e.g., 3a = 18).
In algebra, there are conventional ways of writing multiplication and division.
Students also come to know that linear patterns have a constant increase or decrease and their XY graphs are straight lines. Not all patterns are linear. Algorithms help solve problems in a systematic way. Their instructions are created, tested, and revised.

The Wilkie Way Teacher Challenge



While this makes a lovely Christmas Decoration --

How could you prove that the large hexagon has an area three times larger than the smaller hegaon in the middle?

Clue: Use area of triangles.

For your information and so totally not Maths!

Just months before the government introduces regular phonics testing in primary schools, a UK study claims similar tests in England made little difference to children's reading achievement.
The Education Policy Institute said it found no evidence children's reading improved as a result of the 2012 introduction of phonics screening checks during their first year of school.
The EPI research said the percentage of children passing England's phonics screening check in their first year at school rose from 59 percent in 2012 to 83 percent in 2018.
But it said that did not result in significant improvements in general reading ability in later years.
It also found no improvements in children's writing once pupil and school factors were taken into account.
Were the PSC to have intervened significantly as a lever for reading improvement, this might be reflected by a substantial rise in scores in 2016 and 2021, compared to previous years," it said.
England's average scores improved from 552 points in 2011, the year before the tests were introduced, to 559 and 558 in 2016 and 2021 respectively.
During the same period the percentage of children agreeing a lot that they enjoyed reading fell from 66 to 54 percent for girls and from 49 to 44 percent for boys…
So why is New Zealand planning to put in place something that research says has little to no benefit and is more likely to cause harm. I though we were all for evidence based practice?
Please don't follow with a compulsory online multiplication tables check that all Year 4 students sit in the UK. 25 questions - 6 secs for each. We don't need high stakes testing to know if our students can recall times tables.

New Resources for Wilkie Way Members

Annual Subscriptions purchased at the online store at www.wilkieway.co.nz

Individual $55 - paid via paypal

NZ School paid via invoice - complete form at online store

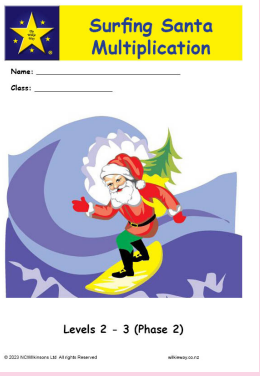
Under 30 Students $60 + GST 30 to 100 students $160+GST

101 - 300 students $260 + GST 301- 500 students $360 +GST

501 - 700 Students $460 + GST 701+ Students $560 + GST

Non NZ School $660 - paid via paypal

Find a range of Christmas Maths Activities under Special Occassions



Assessment Screens

The assessment screens have been amended slightly for 2025 with the addition of vocabulary to assist the answering of questions. They have been altered to reflect the knowledge levels in the new curriculum.
A copy of this chart is available from the information section on wilkieway.co.nz

Wilkie Way Maths Assessment Screens

Screen One	Screen Two	Screen Three	Screen Four
Phase 1 Teaching Sequence ***6mths - Year 2*** **Number Structure:** • Count forwards and backwards from any number in 1's,2's 5's 10's between 1 -100 • Identify, read & write whole numbers up to at least 100 • Compare and order whole numbers up to at least 100 *(No. before/after)* **Operations** • Add and subtract numbers up to 100 without renaming • Recall facts up to 10 • Multiply & Divide using equal grouping	***Phase 1 Teaching Sequence (2 & 3)*** ***Phase 2 Teaching Sequence Year 4*** **Number Structure:** • Identify, read & write whole numbers up to 10 000 & represent using base 10 structure *(expanding)* **Operations:** • Round whole numbers to the nearest 1000, 100 or 10 • Add & subtract 2 and 3 digit numbers • Recall addition facts up to 20 and corresponding subtraction facts • Divide whole numbers by a one digit divisor with no remainders using grouping • Divide up to a 3 digit number by a single digit • Recall multiplication and division facts, ×2, ×3, ×4, ×5, ×6 • Multiply a two digit number by a single digit and two single digit whole numbers **Rational Numbers:** • Identify, read write & represent fractions *(halves quarters, thirds, fifths & eighths)* • Compare & order fractions *(halves & quarters)* • Represent tenths as fractions and decimals • Find a unit fraction of a whole number • Identify from a unit fraction part of a set, the whole number	***Phase 2 Teaching Sequence*** ***Year 4 - Year 6*** **Number Structure** • Identify, read, write whole numbers to the millions **Operations:** • Use estimation • Round whole numbers to a specified power of 10 and round tenths and hundredths to the nearest whole number or one place decimal • Add and subtract any whole number • Recall multiplication & division facts up to 10 × 10 • Multiply multi-digit whole numbers • Divide up to a 4 digit *(3 digit)* by a one digit divisor with a remainder **Rational Numbers** • Identify read and write fractions & decimals and related percentages • Compare & order fractions & decimals *(2 places)* • Multiply & divide by 10 & 100 to make decimals and whole numbers • Add and subtract decimal numbers *(Up to 2 places)* • Convert between mixed numbers & improper fractions • Find a fraction of a whole number • Identify from a fractional part, the whole number **Algebra: Equations & relationships** • Solve open number sentences involving all four operations using an understanding of equality	***Phase 2 Teaching Sequence Year 6*** ***Phase 3 Teaching Sequence (7 & 8)*** **Number Structure** • Identify read & write whole numbers using powers of 10 • Identify prime, square and square roots • Find HCF of 2 numbers under 100 & LCM of two numbers under 10 **Operations:** • Use rounding & estimation with whole numbers & decimals • Multiply whole numbers • Add and subtract integers **Rational Numbers:** • Identify read & write fractions, decimals & percentages • Compare , order and convert between fractions, decimals & percentages • Multiply & divide numbers by powers of 10 • Find equivalent fractions, simplify fractions and convert between improper fractions & mixed numbers • Find a percentage of a whole quantity and find a whole amount given a simple fraction or percentage • Add and subtract fractions with different denominators • Add & subtract decimals with an emphasis on estimation • Multiply fractions & decimals by whole numbers
Additional specific information • 10 more or 10 less than any number (up to 3 digits) • Groups of ten in a two digit number • Standard partitioning • Interprets symbols + - × = in a linear equation	**Additional specific information** 10 more/10 less (up to 4 digits) Groups of 10 in up to 4 digits number. Connection between repeated addition and multiplication Understands an array represents a multiplication and multiplication is commutative		

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Order using the order form in the online store and in the infomration section of wilkieway.co.nz for the pre order 15% discount. Screens are available throughout the year at full price from the online store.

