Te Tāhuhu o te Mātauranga
Ministry of Education

Te Poutāhū
Curriculum Centre

The New Zealand Curriculum

Mathematics and Statistics Year 4

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Te Kāwanatanga o Aotearoa
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Contents

Purpose statement

Ānō me he whare pūngāwerewere.

Behold, it is like the web of a spider.

This whakataukī celebrates intricacy, complexity, interconnectedness, and strength. The Learning Area of Mathematics and Statistics weaves together the effort and creativity of many cultures that over time have used mathematical and statistical ideas to understand their world.

The Mathematics and Statistics Learning Area equips students with conceptual and procedural knowledge that empowers them to explore and make sense of the world. Mathematics and Statistics allows students to appreciate and draw on the power of abstraction, visualisation, and symbolic representation to connect new knowledge to their current understandings of quantity, space, time, data, and uncertainty. Students are taught logical reasoning and critical thinking skills that help them to evaluate information, question assumptions, and express ideas clearly.

Through the study of mathematical and statistical reasoning, students learn how to differentiate what is probable from what is possible and draw reliable conclusions about what is reasonable. As students are taught to notice patterns and variation, select approaches, draw conclusions, and justify their solutions, they build confidence in their mathematical and statistical abilities and problem-solving skills, applying these to new contexts.

The Mathematics and Statistics Learning Area provides students with concepts and tools to investigate, represent, and connect situations, as well as to generalise, explain, and justify their findings. Students learn that Mathematics and Statistics is a creative discipline that sparks curiosity and wonder and that it has been shaped by the contributions of diverse people and cultures over time.

As students progress through the Learning Area, they deepen their understanding of how to use mathematics and statistics accurately, efficiently, and confidently in increasingly complex ways. They are encouraged to engage with important societal issues — such as ethically gathering, interpreting, and communicating data — and to observe and describe similarities, patterns, and trends across natural, technological, and social contexts.

Learning area structure

The year-by-year teaching sequences for Mathematics and Statistics lay out the knowledge and practices to be taught each year. The teaching sequences for Years 0–10 are organised into six strands: Number, Algebra, Measurement, Geometry, Statistics, and Probability.

Number focuses on numerical concepts and systems. It develops students' understanding of how numbers are used to represent quantities, estimate, measure, and perform calculations, and how number systems have evolved to meet practical and social needs.

Algebra focuses on generalisation and mathematical reasoning. It develops students' understanding of how patterns and relationships can be represented using symbols, graphs, and diagrams, and how algebraic thinking supports problem solving and communication.

Measurement focuses on quantifying phenomena using units and systems. It develops students' understanding of how to measure tangible and intangible quantities using standard and non-standard units, and how measurement systems vary across cultures and contexts.

Geometry focuses on shape, space, and transformation. It develops students' understanding of how to visualise, represent, and reason about objects and their position, orientation, and movement, drawing on geometric ideas used across cultures and in the natural world.

Statistics focuses on data and uncertainty. It develops students' understanding of how to collect, organise, and interpret data in context, and how statistical thinking supports informed decision making.

Probability focuses on chance and likelihood. It develops students' understanding of how to quantify uncertainty, make predictions, and evaluate the likelihood of events, supporting probabilistic reasoning in everyday and applied contexts.

The year-by-year teaching sequences, organised through strands and elements, set out what is to be taught. Their enactment is shaped by teachers, who design learning in response to their learners, adjusting the order and emphasis, and adding contexts and content as appropriate.

Introduction

Across years 0–10, Mathematics and Statistics takes students on a journey of increasingly sophisticated thinking about number, patterns, space, and data. Through purposeful exploration and practice, students build the knowledge and fluency they need to solve problems, reason logically, and make sense of the world around them.

The mathematical and statistical processes of investigating, representing and connecting situations, and generalising, explaining, and justifying findings are fundamental to all mathematical and statistical teaching and underpin the way students gain understanding of the knowledge and practices being taught.

Years 0–3

In years 0-3, teaching focuses on building students' ability to investigate, classify, and describe quantities, shapes, and data. Teachers draw attention to properties of numbers and attributes of shapes. Materials and pictures support visualisation of these numerical and geometric concepts. Explicit teaching enables students to make connections between representations and to develop their reasoning.

Years 4–6

In years 4–6, teaching focuses on students' use of a variety of representations to model number operations and to solve word problems. They extend their understanding of whole numbers to fractions and decimals, and they visualise, classify, and draw angles using benchmarks to support and justify their classifications. Students apply their knowledge of number operations to reasoning about measurements and to investigating variations in patterns, shapes, probabilities, and data. They begin to work with exponents, can tell the time, and convert between units of time.

Years 7–8

In years 7 and 8, teaching focuses on students' use of logic and reasoning to identify, clarify, and solve problems, make connections between mathematical and statistical concepts, and investigate patterns and variation. They use appropriate conventions, vocabulary, and algebraic notation to clearly explain solutions and justify their approaches to solving problems. Students select, use, and adapt representations to visualise and extend their reasoning (e.g. number lines to represent integers, and equations to represent linear patterns). They make generalisations, identify and calculate unknown quantities (e.g. the size of angles), and use data visualisations to evaluate claims and make conjectures. They begin to explore irrational numbers and to operate fluently with integers.

Years 9–10

In years 9 and 10, teaching focuses on students' use of proportional reasoning to transform numerical quantities, measurements, and shapes, including right-angled triangles. They begin to generalise their understanding and application of tables, equations, and graphs, including to explore patterns and the connections between different representations. They extend their understanding of area, perimeter, and volume for a variety of 2D shapes, including circles, and 3D shapes, including prisms. They use data visualisations to investigate, represent, and explain patterns, trends, and variation, and they apply their knowledge to situations involving chance.

The Mathematics and Statistics learning area prepares students with the knowledge and practices they need to access related curriculum subjects in years 11–13, such as **Statistics**, **Mathematics**, and **Physics**.

The New Zealand Curriculum

Mathematics and Statistics

Year 4 teaching sequence

Number

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
Number structures	• Whole numbers can be represented in the base 10 number system, where each digit has a place value 10 times that of the digit on the right. • Each digit's value depends both on its position (e.g. the tens position) and the numeral in the position. Zero is used as a placeholder.	• Reading, writing, comparing, and ordering whole numbers up to 10,000 and representing them using base 10 structure
	• Rounding can support predicting or estimating the result of a calculation. • Rounding is based on identifying the nearest place value or unit (ten, hundred, thousand) for a given number; a number line supports this. ***This content is to be taught across Years 4 to 6.***	• Rounding whole numbers to the nearest thousand, hundred, or ten • Rounding tenths to the nearest whole number
		• Counting forwards and backwards in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 25s, and 50s from multiples of the counting unit • Counting in 10s, 100s, and 1,000s from any whole number up to 10,000
Operations	• Addition and subtraction can be carried out mentally, using known facts, place value and partitioning, or column methods. • Standard written algorithms (e.g. column addition, column subtraction) rely on place value, regrouping, and renaming. ***This content is to be taught across Years 4 to 6.***	• Adding and subtracting up to four-digit numbers
	• Multiplication can be represented as repeated addition, scaling, or arrays, and larger numbers can be multiplied using an area model or column multiplication.	• Memorising multiplication and corresponding division facts for 2s to 10s • Using place value and known and derived facts to multiply and divide mentally, including multiplying by 0 and 1 and dividing by 1 • Multiplying two-digit and three-digit numbers by a one-digit number • Dividing up to a three-digit whole number by a one-digit divisor, with no remainder (e.g. $65 \div 5$)
Rational numbers	• The base 10 number system continues past the ones column, to the right, to create decimals such as tenths. • Decimals are fractions that have powers of 10 as their denominators, and they can be written as numbers using a decimal point. • A decimal point marks the column immediately to the right of the ones column as the tenths column. • Tenths can be created by dividing whole numbers by 10 and can be expressed as fractions or decimals. • Improper fractions and mixed numbers are different representations of the same quantity.	• Reading, writing, and representing tenths as fractions and decimals • Comparing and ordering tenths as fractions and decimals • Memorising and using the decimal equivalent of $\frac{1}{2}$ and fractions with denominators of 10 • Dividing one- and two-digit whole numbers by 10 to make decimals and identify tenths • Multiplying decimal tenths by 10 • Comparing and ordering fractions with the same numerator or same denominator • Relating fractions, improper fractions, and mixed numbers to their position on a number line

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
		• Identifying when two fractions are equivalent, using representations
	• Addition and subtraction of fractions with the same denominator follow the same principles as whole numbers and can result in improper fractions or whole numbers.	• Adding and subtracting fractions with the same denominators, including beyond a whole (e.g. $\frac{3}{8} + \frac{3}{8} + \frac{3}{8} = \frac{9}{8} = 1\frac{1}{8}$) • Adding and subtracting decimals to one decimal place (e.g. 1.3 + 0.2 = 1.5)
	• Scaling changes quantities proportionally, using multiplication and division.	• Using known multiplication and division facts to scale a quantity (e.g. to double or halve a recipe) • Finding a unit fraction of a whole number, using multiplication and division facts and where the answer is a whole number (e.g. $\frac{1}{3}$ of 300) • Finding the whole set or amount when given a unit fraction, using multiplication and division facts (e.g. $\frac{1}{4}$ of a set is 7, what is the whole set?)
Financial mathematics	• New Zealand currency is a decimal system of dollars made up of 100 cents.	• Calculating the total cost of several items costing whole-dollar amounts and with different prices, or of multiples of the same item, including giving change • Representing amounts of currency using different combinations of denominations (e.g. making $5 and 80 cents in multiple ways using play money)

Algebra

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
Equations and relationships	• Numbers can be compared using 'greater than' (>), 'less than' (<), and equals (=). • Applying the same operation to both sides of a number sentence preserves the balance.	• Checking the truth of number sentences and completing open number sentences involving addition and subtraction (e.g. $8205 - 4721 = 3484$, true or false?; $4200 - \_ = 4001$) • Checking the truth of number sentences and completing open number sentences involving multiplication and division (e.g. $11 \times 7 = 78$, true or false?; $\_ \div 10 = 12$).
	• Growing patterns can increase or decrease by the addition or subtraction of a constant (arithmetically) or multiplication or division by a constant (geometrically). ***This content is to be taught across Years 4 and 5.***	• Recognising, continuing, creating, and describing growing patterns (including numerical and non-numerical patterns) that change by adding, subtracting, or multiplying by a constant whole number (e.g. $5, 7, 9, 11, \ldots$; $3, 6, 12, 24, \ldots$)

Measurement

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
Measuring	• Different measurement tools and scales use different-sized units; the unit must be recorded with the measurement amount. ***This content is to be taught across Years 4 and 5.***	• Using familiar objects (e.g. body parts) and experiences (e.g. time taken to travel to school, the temperature outside) to create estimation benchmarks • Using the appropriate tool for measuring length, mass (weight), and capacity in mixed units (e.g. 1 m and 23 cm, 10 kg and 3 g, 2 L and 500 mL) • Measuring temperature in degrees Celsius
	• Volume is a measure of regions in three-dimensional space. • The areas of rectangles (including squares) can be calculated by multiplication of side lengths. ***This content is to be taught across Years 4 and 5.***	• Measuring the perimeter of polygons using metric units (mm, cm, and m) • Measuring the areas of irregular shapes covered with squares and half squares • Calculating the areas of rectangular figures (including squares) using multiplication of side lengths • Measuring the volumes of rectangular prisms (cuboids) by filling them with identical 3D blocks
	• Angles are a measure of turn and can be measured using the unit of degrees; a full turn is 360 degrees, a half turn is 180 degrees, and a quarter turn is 90 degrees. • Rectangles and squares have four right angles.	• Estimating the size of angles by comparing them to 90, 180, and 360 degrees
	• A point in time is typically measured in hours and minutes past midnight. • Clocks relate seconds to minutes and minutes to hours according to a system based on 60. ***This content is to be taught across Years 4 and 5.***	• Telling the time on analogue and digital clocks to the nearest minute • Measuring duration in hours, minutes, and seconds, including mixed time units (e.g. 1h and 42mins, 3mins and 21s) • Finding equivalent durations of time using different units (e.g. 3 weeks is 21 days; 90 seconds = 1.5 minutes; 48 hours = 2 days)

Geometry

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
Shapes	• A regular polygon is a two-dimensional shape with all sides of equal length and all interior angles of equal measure. • Circles have an infinite number of lines of symmetry.	• Identifying, classifying, and describing the attributes of regular and irregular polygons of up to 12 sides, using edges, vertices, and angles • Identifying the number of lines of symmetry in 2D shapes
Spatial reasoning	• Shapes may appear different when viewed from a different perspective.	• Visualising 3D shapes and connecting them with 2D diagrams, verbal descriptions, and the same shapes drawn from different perspectives

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
	• A reflection is when a shape is flipped over a line, creating a mirror image. • A translation is when a shape is slid from one place to another without being turned. • A rotation is when a shape is turned around a fixed point. ***This content is to be taught across Years 4 to 6.***	• Performing one-step transformations (reflections, translations, rotations) on 2D shapes
Pathways	• An alphanumeric grid reference is a system that divides a map into labelled rows (letters) and columns (numbers), so that each square can be identified by combining a letter and a number (e.g. A1, B2). ***This content is to be taught across Years 4 to 6.***	• Use alphanumeric and general grid references to identify regions and plot positions on a grid map

Statistics

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
Developing knowledge from data	• A variable is an attribute or measurement of the people or objects being studied: ○ categorical variables classify objects or individuals into groups ○ discrete numerical variables are counted ○ continuous numerical variables are measured.	• Collecting numerical data, and, if needed, rounding to an appropriate unit or part of a unit, based on the context (e.g. How many skips can we do in 30 seconds? How long does it take us to run 1000 m?)
Visualisation of data	• Data visualisations are representations of all available values for a variable showing the frequency for each value. • Data visualisations show patterns, trends, and variations. • Numerical data can be visualised with dot plots or bar graphs. • A good data visualisation includes, where appropriate: ○ a title that gives the purpose of the visualisation ○ variable(s) (e.g. labelled on the axis) ○ the group the data is from ○ units for a numerical variable ○ values or categories ○ frequency, with the scale starting at 0.	• Creating dot-plot or bar-graph data visualisations
Interpretation of data	• Interpreting a data visualisation includes describing its variables and their units, the context for the data, and the visualisation's key features: ○ its shape (e.g. the number of peaks) ○ its middle group(s) (where the middle of the data lies)	• Answering questions about the frequency of a particular value in dot plots • Answering questions about individual values in a dot plot, while referring to the context • Interpreting data visualisations • Distinguishing between when to use a particular value or the frequency for a given value when

Year 4		
	Knowledge *The facts, concepts, principles, and theories to teach.*	**Practices** *The skills, strategies, and applications to teach.*
	○ its spread (how spread the data is from the minimum (lowest) value to the maximum (highest) value). ***This content is to be taught across Years 4 to 6.***	answering questions about dot plots (e.g. How many pets does the person with the most pets have? What's the most common number of pets that anyone has?)

The language of Mathematics and Statistics for Year 4

	Year 4 *Students will be taught the following new words:*	
Number	• approximate • convert • decimal • decimal place • decimal point • infinite • inverse operation	• improper fraction • mixed number • multiple • rename • scale • simplest form • tenth
Algebra	• conjecture • equation	• relationship
Measurement	• angle • benchmark • centi–, kilo– • degree (of angle) • degrees Celsius	• kilogram • irregular • minutes past, minutes to • right angle • temperature
Geometry	• diagonal, horizontal, vertical • grid reference • parallel line • perspective	• quadrilateral • rotation • transformation
Statistics	• discrete numerical, continuous numerical • interpreting • spread	• trends • variation