

Mapping

New Zealand Curriculum Level 4

In a range of meaningful contexts, students will be engaged in thinking mathematically and statistically. They will solve problems and model situations that require them to:

Note: These Achievement Objectives are covered fully by books 4A and 4B of our series.



NZ Curriculum Mathematics – Connecting all strands Level 4A

Number and Algebra

Number strategies and knowledge

Use a range of multiplicative strategies when working on whole numbers.

- Understand the terms multiple and factor and when it is useful to know how to find these.
- Understand and practice the use of each of these multiplication strategies: Using basic facts, including estimating answers; Place value partitioning; Rounding and compensating; Using factors.
- Understand and practice the use of each of the division strategies: Using basic facts, including to estimate answers; Place value Partitioning; Rounding and compensating; Changing both Numbers.
- Choose an appropriate multiplication or division strategy to solve problem in context.
- Use a selection of the four operations in some problem solving contexts.

1 Working with whole numbers

- Multiples and factors
- Multiplication strategies
- Division strategies
- Choosing a strategy for multiplication and division
- Using all four operations

Understand addition and subtraction of fractions, decimals, and integers.

- Explore where negative numbers are used in real life.
- Read integers on temperature and other real life context scales.
- Put integers in order.
- Add and subtract integers in real life contexts.
 - o add and subtract a positive integer
 - o add a negative integer
 - o subtract a negative integer
- Convert between improper fractions and mixed fractions.
- Understand, identify and create equivalent fractions.
- Simplify fractions to their simplest form.
- Draw diagrams to show addition of fractions with the same denominator.
- Add and subtract fractions with the same denominator, giving answers as fractions and mixed fractions in their simplest form.

2 Integers

- Using negative numbers
- Reading integers on scales
- Putting integers in order
- Adding and subtracting integers

3 Fractions

- Equivalent fractions
- Adding and subtracting fractions with the same or similar denominator

Mapping

New Zealand Curriculum Level 4	NZ Curriculum Mathematics – Connecting all strands Level 4A
<ul style="list-style-type: none"> • Add and subtract decimals using place value partitioning. • Add and subtract decimals using rounding and compensating. • Add and subtract decimals using a number line. • Choose an efficient strategy to add and subtract decimals. 	<p>5 Percentages, fractions and decimals</p> <ul style="list-style-type: none"> • Adding and subtracting decimals
<p>Find fractions, decimals, and percentages of amounts expressed as whole numbers, simple fractions, and decimals.</p> <ul style="list-style-type: none"> • Finding a fraction of a whole by finding a unit fraction first. • Understanding how to find percentages using benchmark percentages of 10% ($\frac{1}{10}$), 50% ($\frac{1}{2}$), 1% ($\frac{1}{100}$). 	<p>3 Fractions</p> <ul style="list-style-type: none"> • Fractions of whole numbers <p>5 Percentages, fractions and decimals</p> <ul style="list-style-type: none"> • Finding percentages of quantities
<p>Apply simple linear proportions, including ordering fractions.</p> <ul style="list-style-type: none"> • Using estimation and comparison with $\frac{1}{2}$. • Estimating using number knowledge and deciding if fractions are greater or less than $\frac{1}{2}$ and whether they are closer to 0, $\frac{1}{2}$ or 1. • Using a number line. • By creating equivalent fractions (related denominators). • Explore the meaning of ratios and their similarities and differences to fractions. • Writing ratios for a variety of situations. • Explores how to recognise and make equivalent ratios. • Using ratios to solve simple problems. 	<p>3 Fractions</p> <ul style="list-style-type: none"> • Fraction greater than 1 • Ordering fractions using number lines and benchmarks <p>6 Introducing ratios</p> <ul style="list-style-type: none"> • Understanding ratios • Equivalent ratios • Using ratios
<p>Know the relative size and place value structure of positive and negative integers and decimals to three places.</p> <ul style="list-style-type: none"> • Explore where negative numbers are used in real life. • Read integers on temperature and other real life context scales. • Put integers in order. 	<p>2 Integers</p> <ul style="list-style-type: none"> • Using negative numbers • Reading integers on scales • Putting integers in order

Mapping

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<p>Know the relative size and place value structure of positive and negative integers and decimals to three places.</p> <ul style="list-style-type: none"> • Understand decimal place value and be able to read and write decimals • Understand nested place value e.g. there are 42 tenths altogether in 4.2. • Place decimals on number lines and use this to order them. • Use number lines to help understand decimal place value. • Order decimals by comparing digits in the same place value working from highest place value down. 	<p>5 Percentages, fractions and decimals</p> <ul style="list-style-type: none"> • Decimal place value • Decimals on the number line • Ordering decimals using place value
<p>Know the equivalent decimal and percentage forms for everyday fractions.</p> <ul style="list-style-type: none"> • Explores how percentages and fractions are related and how both are used to describe the same proportion. 	<p>5 Percentages, fractions and decimals</p> <ul style="list-style-type: none"> • Understanding percentages as fractions • Percentages, fractions and decimals
<p>Equations and expressions</p> <ul style="list-style-type: none"> • Form and solve simple linear equations. • Explore how expressions can be used to model situations • Explore how formulae can be written from rules written in words and how they are used to model situations. • Practice at using formulae to solve problems. • Explore writing equations for Cuisenaire rods and how these equations can be written in different ways. • Introduce solving equations using inverse operations using “ I think of a number” problems. 	<p>7 Expressions, formulae and equations</p> <ul style="list-style-type: none"> • Writing and understanding expressions • Modelling real-life situations with formulae • Equations
<p>Patterns and relationships</p> <ul style="list-style-type: none"> • Generalise properties of multiplication and division with whole numbers • Use graphs, tables, and rules to describe linear relationships found in number and spatial patterns. 	<p>8 Relationships and patterns</p> <ul style="list-style-type: none"> • Applying general rules to find unknown numbers • Using tables graphs and rules to describe linear relationships • Number patterns

Mapping

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NZ Curriculum Mathematics –
Connecting all strands Level 4A

Measurement and Geometry

Interpret and use scales, timetables, and charts.

- Convert between am/ pm time and 24 – hour time.
- Find the difference between times given in am/pm time, 24 – hour time or a combination of both.
- Read and interpret timetables and charts.

9 Time, Timetables and charts

- am/pm time and 24-hour time
- Time calculations
- Timetables and charts

Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time.

- Select appropriate units in different contexts and choose the appropriate measuring device.
- Use a known or familiar measure as a comparison to help estimate an unknown measure in a contextual situation.
- Estimate readings on a scale when all the divisions are not shown.
- Read linear scales where measurements are given to two decimal places.
- Estimate and measure length, mass, capacity and time using appropriate measuring devices.
- Recognise acute, right, obtuse, straight and reflex angles in diagrams and real life.
- Estimate and/or recognise the angles that real life objects turn through.
- Estimate and measure the sizes of angles using a protractor.
- Drawing angles using a protractor.
- Use standard naming conventions for angles.
- Find the sizes of missing angles using angles on a straight line add to 180° and angles at a point add to 360° .

10 Using measures

- Choosing units and devices
- Estimating measurements
- Reading scales
- Estimating and measuring

14 Angles

- Angles
- What is the angle?
- Measuring angles
- Drawing angles
- Naming angles
- Angle problems

Convert between metric units, using whole numbers and commonly used decimals.

- Convert larger units to smaller units using whole numbers and simple decimals in non contextual and contextual questions.
- Convert smaller units to larger units using whole numbers and simple decimals in non contextual and contextual questions.
- Convert between metric units in a variety of contexts
- Order metric units.

11 Converting between units

- Whole number metric conversions
- Converting larger to smaller units
- Converting smaller to larger units
- Mixed conversions

Mapping

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<p>Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids.</p> <ul style="list-style-type: none">• Find the perimeter of squares, rectangles, and parallelograms with whole number and simple decimal dimensions.• Find missing lengths given the perimeter.• Choose appropriate area units.• Find the area of shapes drawn on squared paper.• Use formulae to find the area of rectangles, squares and parallelograms in non-contextual and contextual questions.• Find the area of composite shapes made from rectangles and squares. <ul style="list-style-type: none">• The relationship between volume, mass and capacity.• Find volumes of cubes and cuboids using counting cubes and volume formula in non-contextual and contextual questions.	<p>12 Perimeter and area</p> <ul style="list-style-type: none">• Perimeter• Area• Area by counting squares• Area of rectangles, squares and parallelograms• Areas of shapes made from rectangles and squares <p>13 Volume</p> <ul style="list-style-type: none">• Volume, mass and capacity
<p>Transformation</p> <ul style="list-style-type: none">• Use the invariant properties of figures and objects under transformations (reflection, rotation, translation or enlargement).• Find lines of symmetry and state the order of line symmetry.• Recognise whether shapes have rotational symmetry and if so find the order.• Draw and answer questions about reflections, rotations and translation of objects.• Recognise the invariant properties under reflection, rotation and translation.• Find enlargements of objects• Recognise the invariant properties under enlargement.• Describe the transformations that have been used to create patterns.• Create tessellations and determine which triangles and quadrilaterals tessellate, and why.	<p>15 Symmetry and transformations</p> <ul style="list-style-type: none">• Line symmetry• Rotational symmetry• Rotation, translation and reflection• Enlargement• Recognising transformations in patterns• Tessellations

Mapping

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<p>Shape</p> <ul style="list-style-type: none"> • Identify classes of two and three-dimensional shapes by their geometric properties. • Name and know the properties of triangles. • Name and know the properties of quadrilaterals and polygons, triangles, including side, angle and symmetry properties. • Sort shapes into groups with a common property. • Draw cross sections of 3-D shapes. • Name and identify the number of faces, edges and vertices of 3-D shapes. 	<p>16 Shape</p> <ul style="list-style-type: none"> • Properties of triangles • Properties of quadrilaterals and polygons • Sorting shapes • Cross-sections • 3-D shapes
<p>Relate three-dimensional models to two-dimensional representations and vice versa.</p> <ul style="list-style-type: none"> • Match nets with 3-D shapes and vice versa. • Draw 3-D shapes on isometric paper. • Deduce the number of missing cubes and visualise the faces that can be seen on a 3-D shape depending on position of view. • Draw and recognise plan, front, side views of 3-D shapes. 	<p>17 Nets and 3-D drawings</p> <ul style="list-style-type: none"> • Nets • Isometric drawing • Views
<p>Position and orientation</p> <p>Communicate and interpret locations and directions, using compass directions, distances, and grid references.</p> <ul style="list-style-type: none"> • Describe the location of and locate places using grid references that have two letters and numbers and coordinate references that have two numbers on both axes. • Be able to use compass directions to locate and describe the location of places and follow directions. • Use the scale on a map or plan to work out distances in real life. • Locate, describe the location of, and follow directions using the scale of a map and compass directions. 	<p>18 Location</p> <ul style="list-style-type: none"> • Grid and coordinate references • Compass directions • Reading maps and plans using scales and compass directions

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Statistics	
<p>Statistical literacy</p> <p>Evaluate statements made by others about the findings of statistical investigations and probability activities.</p> <ul style="list-style-type: none"> • Find the mode, range, mean and median of data sets and use these to analyse or compare data. • Answer questions and make statements about displays from investigations carried out by others. 	<p>19 Analysing data</p> <ul style="list-style-type: none"> • Mode and range • Mean and median • Using mean, median, mode and range • Analysing data displays
<p>Gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships and trends</p> <ul style="list-style-type: none"> • comparing distributions visually. • communicating findings, using appropriate displays. • Deciding the best graph to display data and analysing the display. • Displaying time series data on a graph and analysing the display. <p style="text-align: center;"><i>Example The rainfall in your region over the last month (time).</i></p>	<p>20 Displaying data</p> <ul style="list-style-type: none"> • Displaying data and analysing the displays • Time-series graphs
<p>Statistical investigation</p> <p>Plan and conduct investigations using the statistical enquiry cycle:</p> <ul style="list-style-type: none"> • determining appropriate variables and data collection methods • Understand and be able to carry out each step of the enquiry cycle. • Understand that at any point in the Enquiry Cycle, you may need/want to go back/forward to another step of the Enquiry Cycle. • Design a collection sheet that is appropriate for the data to be collected • Group discrete numerical data using a frequency table and equal class intervals. <i>(Note: Grouping measurement data is covered in book 2).</i> • Understand that qualitative data and opinions can be collected and /or displayed using a variety of scales and graphs including the Likert scale. 	<p>21 Statistical investigation</p> <ul style="list-style-type: none"> • The Enquiry Cycle • Collection sheets <ul style="list-style-type: none"> • Grouped data • Designing sheets for qualitative data

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<p>Probability</p> <p>Investigate situations that involve elements of chance by comparing experimental distributions with expectations from models of the possible outcomes, acknowledging variation and independence.</p> <p>Use simple fractions and percentages to describe probability</p> <ul style="list-style-type: none">• Understand that some events are more likely than others and be able to order probabilities of events.• Understand that some events are impossible and some are certain.• Understand that probability can be described using a fraction from 0 to 1 with 1 being certain and 0 being impossible.• List all the possible outcomes of an event with one, two or three stage chance situations. Begin to understand that events can be independent or dependent.• Understand that the probability of an event can be calculated if the outcomes are all equally likely.• Know that the probability of an event can be given as a fraction where the denominator is the total number of outcomes and the numerator is the number of possible ways the event can happen. This fraction can then be simplified.• Understand that some probabilities cannot be calculated and can only be found by experiment.• Understand that an estimate of the probability of an event can be found from the experiment using a fraction where the denominator is the total number of trials and the numerator is the total number of times the event occurred during the experiment.• Understand that the more trials that are carried out the more accurate the experimental probability will be.	<p>22 Probability</p> <ul style="list-style-type: none">• Understanding probability• The probability scale• Outcomes• Probability from experiments• Calculating theoretical probability