

Mapping Australian Curriculum (AC) Mathematics and VELS Mathematics

In the following document, the left hand column shows AC content that matches VELS content at the corresponding levels. Teaching programs based on the VELS content and structure will generally be consistent with AC Mathematics.

The right hand column shows:

- where the same content is covered but at different levels
- content that is included in the VELS only or the AC only
- differences in emphasis, scope and treatment

Australian Curriculum (AC) Year 7 – Year 8	Comments on differences in content/emphasis/sequence with respect to the VELS Level 5
<p>Year 7 Number and Algebra</p> <p><i>Number and place value</i> <i>Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)*</i></p> <ul style="list-style-type: none"> • <i>Investigate and use square roots of perfect square numbers (ACMNA150)*</i> • <i>Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)*</i> • <i>Compare, order, add and subtract integers (ACMNA280)*</i> <p><i>Real numbers</i></p> <ul style="list-style-type: none"> • <i>Compare fractions using equivalence. Locate and represent fractions and mixed numbers on a number line (ACMNA152)*</i> • <i>Solve problems involving addition and subtraction of fractions, including those with unrelated denominators (ACMNA153)*</i> • <i>Multiply and divide fractions and decimals using efficient written strategies and digital technologies (ACMNA154)*</i> • <i>Express one quantity as a fraction of another, with and without the use of digital technologies (ACMNA155)*</i> 	<p>Teachers can continue to provide activities at Level 5 that require students to estimate squares and square roots of numbers, including those that are not perfect squares, evaluate simple fractions in base-exponent form, for example $(2/3)^2$, and calculate cubes and cube roots of perfect cubes. This content is not included in the AC.</p> <p>Teachers can continue to provide activities at Level 5 that require students to express natural numbers in binary form and add and multiply numbers in this form. This content is not included in the AC.</p> <p>At Year 7 the AC includes investigation and calculation of 'best buys', with and without digital technologies.</p>

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- Round decimals to a specified number of decimal places (ACMNA156)*
- Connect fractions, decimals and percentages and carry out simple conversions (ACMNA157)*
- Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies(ACMNA158)*
- Recognise and solve problems involving simple ratios(ACMNA173)*

Money and financial mathematics

- Investigate and calculate 'best buys', with and without digital technologies (ACMNA174)*

Patterns and algebra

- Introduce the concept of variables as a way of representing numbers using letters(ACMNA175)*
- Create algebraic expressions and evaluate them by substituting a given value for each variable (ACMNA176)*
- Extend and apply the laws and properties of arithmetic to algebraic terms and expressions (ACMNA177)*

Linear and non-linear relationships

- Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (ACMNA178)*
- Solve simple linear equations (ACMNA179)*
- Investigate, interpret and analyse graphs from authentic data (ACMNA180)*

Year 8 Number and Algebra

Number and place value

- Use index notation with numbers to establish the index laws with positive integral indices and the zero index (ACMNA182)*
- Carry out the four operations with rational numbers and integers, using efficient mental and written strategies and appropriate digital technologies (ACMNA183)*

At Year 8 the AC includes solving problems involving profit and loss, with and without digital technologies.

At Level 5, the VELS includes recognition of quadratic (square) patterns in number, representing simple non-linear functions and relations (such as $xy = 24$, $y = 2^x$ and $y = x^2 - 3$) using tables, using tables and graphs and solving equations, inequalities in various modelling contexts. It also includes independent and dependent variables, domain, range and one-one or many-one correspondences. Graphs of simple non-linear relations and related equations are covered at Year 9 of the AC.

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Real numbers

- Investigate terminating and recurring decimals (ACMNA184)*
- Investigate the concept of irrational numbers, including π (ACMNA186)*
- Solve problems involving the use of percentages, including percentage increases and decreases, with and without digital technologies (ACMNA187)*
- Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)*

Money and financial mathematics

- Solve problems involving profit and loss, with and without digital technologies (ACMNA189)*

Patterns and algebra

- Extend and apply the distributive law to the expansion of algebraic expressions (ACMNA190)*
- Factorise algebraic expressions by identifying numerical factors (ACMNA191)*
- Simplify algebraic expressions involving the four operations (ACMNA192)*

Linear and non-linear relationships

- Plot linear relationships on the Cartesian plane with and without the use of digital technologies (ACMNA193)*
- Solve linear equations using algebraic and graphical techniques. Verify solutions by substitution (ACMNA194)*

Teachers can continue to provide at Level 5 activities in which students represent sets and operations on sets (complement, intersection, union, subset, power set) in various ways; and test the validity of statements involving connectives and quantifiers. This content is not included in the AC.

Venn diagrams and two-way tables are included as part of the *Chance* topic at Year 8 of the AC.

Teachers can continue to cover material on sets as indicated in the VELS Level 5 to develop students understanding and skills in working with number systems, relations and functions, solving equations, statistics and probability, as well as familiarity with the corresponding mathematical representations.

Teachers can continue to provide activities where students plot graphs of simple non-linear relations (e.g. graph of the factor pairs of 24, sequences such as repeated doubling and halving from a given number and squaring) as a contrast to those of linear relations.

At Level 5, the VELS has a stronger emphasis on inverse relations. Teachers can continue to include solving simple non-linear equations of these such as calculating the side length/diameter of a square/circle given the area, or finding the length of a rectangle of fixed area for various values of its width.

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Year 7 Measurement and Geometry

Shape

- Draw different views of prisms and solids formed from combinations of prisms (ACMMG161)*

Location and transformation

- Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates.
- Identify line and rotational symmetries (ACMMG181)*

Geometric reasoning

- Identify corresponding, alternate and co-interior angles when two parallel straight lines are crossed by a transversal (ACMMG163)*
- Investigate conditions for two lines to be parallel and solve simple numerical problems using reasoning (ACMMG164)*
- Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral (ACMMG166)*
- Classify triangles according to their side and angle properties and describe quadrilaterals (ACMMG165)*

Year 8 Measurement and Geometry

Geometric reasoning

- Define congruence of plane shapes using transformations (ACMMG200)*
- Develop the conditions for congruence of triangles (ACMMG201)*
- Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning (ACMMG202)*

Teachers can continue to provide activities at Level 5 in which students: use single point perspective, contours, isobars and bearings; make tessellations; use network diagrams and apply them to problems involving connectedness and traversability. This content is not included in the AC.

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<p>Year 7 Measurement and Geometry</p> <p>Using units of measurement</p> <ul style="list-style-type: none"> • Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (ACMMG159)* • Calculate volumes of rectangular prisms (ACMMG160)* <p>Year 8 Measurement and Geometry</p> <p>Using units of measurement</p> <ul style="list-style-type: none"> • Choose appropriate units of measurement for area and volume and convert from one unit to another (ACMMG195)* • Find perimeters and areas of parallelograms, rhombuses and kites (ACMMG196)* • Investigate the relationship between features of circles such as circumference, area, radius and diameter. Use formulas to solve problems involving circumference and area (ACMMG197)* • Develop the formulas for volumes of rectangular and triangular prisms and prisms in general. Use formulas to solve problems involving volume (ACMMG198)* • Solve problems involving duration, including using 12- and 24-hour time within a single time zone (ACMMG199)* 	<p>At Level 5, the VELs includes measurement of surface area and temperature, areas of simple composite shapes, and surface area and volume of cylinders. Surface area of cylinders is included at Year 9 of the AC. The VELs includes forming upper and lower bounds for measurements and calculation of absolute percentage error. While this is not included explicitly as content in the AC, it can be included as part of the Reasoning proficiency at Year 8 of the AC.</p> <p>At Year 8 the AC emphasises students solving problems involving duration, including using 12- and 24-hour time within a single time zone.</p>
<p>Year 7 Statistics and Probability</p> <p>Chance</p> <ul style="list-style-type: none"> • Construct sample spaces for single-step experiments with equally likely outcomes (ACMSP167)* • Assign probabilities to the outcomes of events and determine probabilities for events (ACMSP168)* <p>Data representation and interpretation</p> <ul style="list-style-type: none"> • Identify and investigate issues involving continuous or large count data 	

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*collected from primary and secondary sources (ACMSP169)**

- *Construct and compare a range of data displays including stem-and-leaf plots and dot plots (ACMSP170)**
- *Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data (ACMSP171)**
- *Describe and interpret data displays and the relationship between the median mean and range (ACMSP172)**

Year 8 Statistics and Probability

Chance

- *Identify complementary events and use the sum of probabilities to solve problems (ACMSP204)**
- *Describe events using language of 'at least', exclusive 'or' (A or B but not both), inclusive 'or' (A or B or both) and 'and' (ACMSP205)**
- *Represent such events in two-way tables and Venn diagrams and solve related problems (ACMSP292)**

Data representation and interpretation

- *Explore the practicalities and implications of obtaining representative data using a variety of investigative processes (ACMSP264)**
- *Explore the variation of means and proportions of random samples drawn from the same population (ACMSP293)**
- *Investigate the effect of individual data values , including outliers, on the mean and median (ACMSP207)**

At Year 8, the AC includes exploration of *the variation of means and proportions of random samples drawn from the same population* and investigation of *the effect of individual data values, including outliers, on the mean and median*. This content is included in the VELS Level 6.

At Level 5, the VELS includes the use of tree diagrams to investigate the probability of outcomes in simple multiple event trials. This is included at Year 9 of the AC. The VELS also includes the use of mean absolute difference as a measure of spread. This content is not included in the AC. Teachers can continue to provide activities that include this content.

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The proficiency strands: Understanding, Fluency, Problem Solving and Reasoning *are an integral part of mathematics content across the three content strands: Number and Algebra, Measurement and Geometry, and Statistics and Probability. The proficiencies reinforce the significance of working mathematically within the content and describe how the content is explored or developed. They provide the language to build in the developmental aspects of the learning of mathematics.*

At Year 7:

Understanding *includes describing patterns in uses of indices with whole numbers, recognising commonalities between fractions, decimals, percentages and ratios, plotting points on the Cartesian plane, identifying angles formed by a transversal crossing a pair of parallel lines, and connecting the laws and properties of numbers to algebraic terms and expressions*

Fluency *includes calculating accurately with integers, representing fractions and decimals in various ways, investigating best buys, evaluating measures of central tendency and calculating areas of shapes and volumes of prisms*

Problem Solving *includes formulating and solving authentic problems using numbers and measurements, creating transformations and identifying symmetry, calculating angles and interpreting sets of data collected through chance experiments*

Reasoning *includes applying the number laws to calculations, applying known geometric facts to draw conclusions about shapes, applying an understanding of ratio and interpreting data displays*

At Year 8:

Understanding *includes describing patterns in uses of indices and repeating decimals, identifying commonalities between operations with algebra and arithmetic, connecting rules of relations and functions and their graphs, explaining the function of statistical measures, and contrasting*

The *Working mathematically* dimension of the VELS can be used to highlight the application of the proficiencies in the strands and sub-strands of the AC across the corresponding year Levels. At Years 7 and 8 of the AC (VELS Level 5) this could include:

- Formulating conjectures and following simple mathematical deductions (for example, if the side length of a cube is doubled, then the surface area increases by a factor of four, and the volume increases by a factor of eight)
- Using variables in general mathematical statements and substituting numbers for variables (for example, in equations, inequalities, identities and formulas)
- Explaining geometric propositions (for example, by varying the location of key points and/or lines in a construction)
- Developing simple mathematical models for real situations (for example, using constant rates of change for linear models)
- Developing generalisations by abstracting the features from situations and expressing these in words and symbols
- Predicting using interpolation (working with what is already known) and extrapolation (working beyond what is already known)
- Analysing the reasonableness of points of view, procedures and results, according to given criteria, and identifying limitations and/or constraints in context
- Using technology such as spread-sheets, dynamic geometry software and computer algebra systems for a range of mathematical purposes including numerical computation, graphing, investigation of patterns and relations for algebraic expressions, and the production of geometric drawings.

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measurements of perimeter and area

Fluency includes calculating accurately with simple decimals, indices and integers, recognising equivalence of common decimals and fractions including repeating decimals, factorising and simplifying basic algebraic expressions, evaluating perimeters, areas and volumes of common shapes, and calculating the mean and median of small sets of data

Problem Solving includes formulating and modelling, with comparisons of ratios, profit and loss, authentic situations involving areas and perimeters of common shapes and analysing and interpreting data using two-way tables

Reasoning includes justifying the result of a calculation or estimation as reasonable, explaining formal and intuitive use of ratios for comparing rates and prices, deriving one probability from its complement, using congruence to deduce properties of triangles, and making inferences about data

They solve linear equations and graph linear relationships on the Cartesian plane. Students convert between units of measurement for area and volume. They perform calculations to determine perimeter and area of parallelograms, rhombuses and kites. They name the features of circles and calculate the areas and circumferences of circles. Students determine complementary events and calculate the sum of probabilities.

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