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 3 – Year 6	Comments on differences in content/emphasis/sequence with respect to the VELS Levels 3 and 4
Year 3 Number and Algebra ***Number and place value*** • *Investigate the conditions required for a number to be odd or even and identify odd and even numbers (ACMNA051)** • *Recognise, model, represent and order numbers to at least 10 000 (ACMNA052)** • *Apply place value to partition, rearrange and regroup numbers to at least 10 000 to assist calculations and solve problems (ACMNA053)** • *Recognise and explain the connection between addition and subtraction (ACMNA054)** • *Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation (ACMNA055)** • *Recall multiplication facts of two, three, five and ten and related division facts (ACMNA056)** • *Represent and solve problems involving multiplication using efficient mental and written strategies and appropriate digital technologies (ACMNA057)**	At Level 3, the VELS includes students rounding to the nearest unit, ten, hundred or thousand; forming estimates for calculations and recognising whether these are likely to be over-estimates or under- estimates. This is included at *Year 5* of the AC. This is the first explicit reference to the use of technology for computation in the AC. The VELS includes students using digital technologies from Level

	1. Students should be able to use digital technologies effectively for computation with all four arithmetic operations, as well as a developing proficiency with mental and written computations.
Fractions and decimals • *Model and represent unit fractions including 1/2, 1/4, 1/3, 1/5 and their multiples to a complete whole (ACMNA058)** ***Money and financial mathematics*** • *Represent money values in multiple ways and count the change required for simple transactions to the nearest five cents (ACMNA059)** ***Patterns and algebra*** • *Describe, continue, and create number patterns resulting from performing addition or subtraction (ACMNA060)** **Year 4 Number and Algebra** ***Number and place value*** • *Investigate and use the properties of odd and even numbers (ACMNA071)** • *Recognise, represent and order numbers to at least tens of thousands (ACMNA072)** • *Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (ACMNA073)** • *Investigate number sequences involving multiples of 3, 4, 6, 7, 8, and 9 (ACMNA074)** • *Recall multiplication facts up to 10 × 10 and related division facts (ACMNA075)** • *Develop efficient mental and written strategies and use appropriate digital technologies for multiplication and for division where there is no remainder (ACMNA076)**	At Level 3, the VELS includes students working with remainders, and patterns in remainders on division. This is included at Year 5 of the AC.

* Please note this is a reference to the Australian Curriculum Mathematics(ACM) and the relevant strand - Number Algebra (ACMNA) / Measure Geometry (ACMMG) / Statistics Probability (ACMSP)

Fractions and decimals	The AC is explicit about the use of counting sequences by unit fractions (halves, quarters and thirds) to and beyond a whole unit, and location and representation of these on a number line at Year 4.
• *Investigate equivalent fractions used in contexts (ACMNA077)**	
• *Count by quarters halves and thirds, including with mixed numerals. Locate and represent these fractions on a number line (ACMNA078)**	At Level 3, the VELS requires students to order, add and subtract simple common fractions using materials. This is included at Year 5 of the AC.
• *Recognise that the place value system can be extended to tenths and hundredths. Make connections between fractions and decimal notation (ACMNA079)**	
Money and financial mathematics	
• *Solve problems involving purchases and the calculation of change to the nearest five cents with and without digital technologies (ACMNA080)**	
Patterns and algebra	
• *Explore and describe number patterns resulting from performing multiplication (ACMNA081)**	
• *Solve word problems by using number sentences involving multiplication or division where there is no remainder (ACMNA082)**	
• *Use equivalent number sentences involving addition and subtraction to find unknown quantities (ACMNA083)**	

Year 3 Measurement and Geometry *Shape* • *Make models of three-dimensional objects and describe key features (ACMMG062)** *Location and transformation* • *Create and interpret simple grid maps to show position and pathways (ACMMG065)** • *Identify symmetry in the environment (ACMMG066)** *Geometric reasoning* • *Identify angles as measures of turn and compare angle sizes in everyday situations ((ACMMG064)**	 The AC includes angles as measures of turn and compares their sizes in everyday situations (Year 3) and classifies them as equal to, greater than or less than a right angle (Year 4) earlier than in the VELS. This is included at Level 4 of the VELS.
Year 4 Measurement and Geometry *Shape* • *Compare the areas of regular and irregular shapes by informal means (ACMMG087)** • *Compare and describe two dimensional shapes that result from combining and splitting common shapes, with and without the use of digital technologies (ACMMG088)** *Location and transformation* • *Use simple scales, legends and directions to interpret information contained in basic maps (ACMMG090)** • *Create symmetrical patterns, pictures and shapes with and without digital technologies (ACMMG091)**	 At Level 3, the VELS includes space filling patterns such as simple tessellations and tangrams. This is not explicitly included in the AC, however it can be incorporated in work on *Location and transformation* at Year 5 of the AC.

Geometric reasoning • *Compare angles and classify them as equal to, greater than or less than a right angle (ACMMG089)**	
Year 3 Measurement and Geometry ***Using units of measurement*** • *Measure, order and compare objects using familiar metric units of length, mass and capacity (ACMMG061)** • *Tell time to the minute and investigate the relationship between units of time (ACMMG062)** **Year 4 Measurement and Geometry** ***Using units of measurement*** • *Use scaled instruments to measure and compare lengths, masses, capacities and temperatures (ACMMG084)** • *Compare objects using familiar metric units of area and volume (ACMMG290)** • *Convert between units of time (ACMMG085)** • *Use am and pm notation and solve simple time problems (ACMMG086)**	
Year 3 Statistics and Probability ***Chance*** • *Conduct chance experiments, identify and describe possible outcomes and recognise variation in results (ACMSP067)**	

Data representation and interpretation	
• *Identify questions or issues for categorical variables. Identify data sources and plan methods of data collection and recording (ACMSP068)**	
• *Collect data, organise into categories and create displays using lists, tables, picture graphs and simple column graphs, with and without the use of digital technologies (ACMSP069)**	
• *Interpret and compare data displays (ACMSP070)**	
Year 4 Statistics and Probability	
Chance	
• *Describe possible everyday events and order their chances of occurring (ACMSP092)**	
• *Identify everyday events where one cannot happen if the other happens (ACMSP093)**	The AC informally introduces the notions of mutually exclusive and independent events at Year 4. These are included formally at Year 8 (mutually exclusive) and Year 10 (independent and conditional) of the AC and Levels 5 and 6 of the VELS respectively.
• *Identify events where the chance of one will not be affected by the occurrence of the other (ACMSP094)**	
Data representation and interpretation	
• *Select and trial methods for data collection, including survey questions and recording sheets (ACMSP095)**	
• *Construct suitable data displays, with and without the use of digital technologies, from given or collected data. Include tables, column graphs and picture graphs where one picture can represent many data values (ACMSP096)**	At Level 3, the VELS includes recognition of different types of data (discrete and continuous, categorical), and to recognition of samples as subsets of a population. Data types are included at Years 5 and 6 of the AC. The VELS also includes the use Venn diagrams. These are included at Year 8 of the AC. Set notation can be introduced here if it has not been done earlier.
• *Evaluate the effectiveness of different data features including variability (ACMSP097)**	

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 3:

Understanding *includes connecting number representations with number sequences, partitioning and combining numbers flexibly, representing unit fractions, using appropriate language to communicate times, and identifying environmental symmetry*

Fluency *includes recalling multiplication facts, using familiar metric units to order and compare objects, identifying and describing outcomes of chance experiments, interpreting maps and communicating positions*

Problem Solving *includes formulating and modelling authentic situations involving planning methods of data collection and representation, making models of three-dimensional objects and using number properties to continue number patterns*

Reasoning *includes using generalising from number properties and results of calculations, comparing angles, creating and interpreting variations in the results of data collections and data displays*

At Year 4:

Understanding *includes making connections between representations of numbers, partitioning and combining numbers flexibly, extending place value to decimals, using appropriate language to communicate times, using informal units for comparing, and describing properties of symmetrical shapes*

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. For example at Years 3 and 4 of the AC (VELS Level 3) this can include:

- recognition of the mathematical structure of problems and use appropriate strategies (for example, recognition of sameness, difference and repetition)

- testing the truth of mathematical statements and generalisations, for example, in:
  - Number (which shapes can be easily used to show fractions)
  - Computations (whether products will be odd or even, the patterns of remainders from division)
  - Number patterns (the patterns of ones digits of multiples, terminating or repeating decimals resulting from division)
  - Shape properties (which shapes have symmetry, which solids can be stacked)
  - Transformations (the effects of slides, reflections and turns on a shape)
  - Measurement (the relationship between size and capacity of a container).

- Use of calculators to explore number patterns and check the accuracy of estimations.

- Use of a variety of computer software to create diagrams, shapes, tessellations and to organise and present data.

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Fluency *includes recalling multiplication tables, communicating sequences of simple fractions, using instruments to measure accurately, creating patterns with shapes and their transformations, and collecting and recording data*

Problem Solving *includes formulating, modelling and recording authentic situations involving operations, comparing large numbers and time durations, and using properties of numbers to continue patterns*

Reasoning *includes using generalising from number properties and results of calculations, deriving strategies for unfamiliar multiplication and division tasks, comparing angles, communicating information using graphical displays and evaluating the appropriateness of different displays*

Year 5 Number and Algebra	VELS Level 4
Number and place value • Identify and describe factors and multiples of whole numbers and use them to solve problems (ACMNA098)* • Use estimation and rounding to check the reasonableness of answers to calculations (ACMNA099)* • Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (ACMNA100)* • Solve problems involving division by a one digit number, including those that result in a remainder (ACMNA101)* • Use efficient mental and written strategies and apply appropriate digital technologies to solve problems (ACMNA291)* **Fractions and decimals** • Compare and order common unit fractions and locate and represent them on a number line (ACMNA102)* • Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (ACMNA103)* • Recognise that the number system can be extended beyond hundredths (ACMNA104)* • Compare, order and represent decimals (ACMNA105)* **Money and financial mathematics** • Create simple financial plans (ACMNA106)* **Patterns and algebra** • Describe, continue and create patterns with fractions, decimals and whole	At Level 4, the VELS includes calculation of simple powers of whole numbers such as 2^4 = 16. This is included at Year 7 of the AC. In contexts involving *money*, the use of digital technologies can include problems where more than one operation is used and order of operation needs to be considered.

numbers resulting from addition and subtraction (ACMNA107)*
- *Use equivalent number sentences involving multiplication and division to find unknown quantities (ACMNA121)**

Year 6 Number and Algebra

Number and place value
- *Identify and describe properties of prime, composite, square and triangular numbers (ACMNA122)**
- *Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)**
- *Investigate everyday situations that use integers. Locate and represent these numbers on a number line (ACMNA124)**

The *set of integers Z* = { … -3, -2, -1, 0, 1, 2, 3 …} can be introduced in the context of representing values on a scale (a discrete number line) that goes 'below zero', for example a temperature of -7° C in an alpine region during winter, or a desert region at night. It can also be noted that the number line could be extended to represent negative decimal fractions decimal fractions such as -4.5° C where -7° C < -4.5° C.

Fractions and decimals
- *Compare fractions with related denominators and locate and represent them on a number line (ACMNA125)**
- *Solve problems involving addition and subtraction of fractions with the same or related denominators (ACMNA126)**
- *Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies (ACMNA127)**
- *Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (ACMNA128)**
- *Multiply decimals by whole numbers and perform divisions that result in terminating decimals, with and without digital technologies (ACMNA129)**
- *Multiply and divide decimals by powers of 10 (ACMNA130)**
- *Make connections between equivalent fractions, decimals and percentages (ACMNA131)**

At Level 4, the VELS includes *multiplication* fractions. This is included at Year 7 of the AC.

Money and financial mathematics

• *Investigate and calculate percentage discounts of 10%, 25% and 50% on sale items, with and without digital technologies (ACMNA133)**	
Patterns and algebra	
• *Continue and create sequences involving whole numbers, fractions and decimals. Describe the rule used to create the sequence (ACMNA133)**	At Level 4, the VELS includes the identification of relationships between variables and their description in words, for example, considering how a student's level of hunger varies over a day. This is included at *Year 7* in the AC.
• *Explore the use of brackets and order of operations to write number sentences (ACMNA134)**	The distributive property for multiplication over division is included in Level 3 of the VELS.
	Teachers can continue to include activities that require students to form sets according to criteria, and use Venn diagrams and Karnaugh maps to test the validity of statements involving quantifiers *none*, *some*, *all* (from VELS Level 4). This is not included in the AC.
Year 5 Measurement and Geometry **Shape** • *Connect three-dimensional objects with their nets and other two-dimensional representations (ACMMG111)** **Location and transformation** • *Use a grid reference system to describe locations. Describe routes using landmarks and directional language (ACMMG113)** • *Describe translations, reflections and rotations of two-dimensional shapes. Identify line and rotational symmetries (ACMMG114)** • *Apply the enlargement transformation to familiar two dimensional shapes and explore the properties of the resulting image compared with the original (ACMMG115)** **Geometric reasoning** • *Estimate, measure and compare angles using degrees. **Construct angles***	

*using a protractor (ACMMG112)**	Students should also be able to use digital technology such as dynamic geometry software to construct an angle of a specified size in degrees.
Year 6 Measurement and Geometry	
Shape	
• *Construct simple prisms and pyramids (ACMMG140)**	
Location and transformation	
• *Investigate combinations of translations, reflections and rotations, with and without the use of digital technologies (ACMMG142)**	
• *Introduce the Cartesian coordinate system using all four quadrants (ACMMG143)**	At Year 6, the AC includes *Introduce the Cartesian coordinate system using all four quadrants; Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles;* and *Use results to find unknown angles* earlier than in the VELS. These are included at *Level 5* in the VELS.
Geometric reasoning	
• *Investigate, with and without digital technologies, angles on a straight line, angles at a point and vertically opposite angles. Use results to find unknown angles (ACMMG141)**	At Level 4, the VELS includes students noting and describing invariance under transformation, creating tessellations and using network diagrams to show relationships and connectedness. These are not included in the AC.
Year 5 Measurement and Geometry	
Using units of measurement	
• *Choose appropriate units of measurement for length, area, volume, capacity and mass (ACMMG108)**	At Level 4, the VELS includes *estimation and measurement of surface area and temperature.* Temperature is included at Year 4 in the AC. The surface area of cylinders is included at Year 9 in the AC.
• *Calculate the perimeter and area of rectangles using familiar metric units (ACMMG109)**	
• ***Compare 12- and 24-hour time systems and convert between them (ACMMG110)****	*Timetables* are included at Level 3 in the VELS.

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Year 6 Measurement and Geometry ***Using units of measurement*** • *Connect decimal representations to the metric system (ACMMG135)** • *Convert between common metric units of length, mass and capacity (ACMMG136)** • *Solve problems involving the comparison of lengths and areas using appropriate units (ACMMG137)** • *Connect volume and capacity and their units of measurement (ACMMG138)** • *Interpret and use* **timetables** *(ACMMG139)**	
Year 5 Statistics and Probability ***Chance*** • *List outcomes of chance experiments involving equally likely outcomes and represent probabilities of those outcomes using fractions (ACMMG116)** • *Recognise that probabilities range from 0 to 1(ACMMG117)** ***Data representation and interpretation*** • *Pose questions and collect categorical or numerical data by observation or survey (ACMMG118)** • *Construct displays, including column graphs, dot plots and tables, appropriate for data type, with and without the use of digital technologies (ACMMG119)** • *Describe and interpret different data sets in context (ACMMG120)** **Year 6 Statistics and Probability** ***Chance*** • *Describe probabilities using fractions, decimals and percentages (ACMSP144)**	

• *Conduct chance experiments with both small and large numbers of trials using appropriate digital technologies (ACMSP145)** • *Compare observed frequencies across experiments with expected frequencies (ACMSP146)** **Data representation and interpretation** • *Interpret and compare a range of data displays, including side-by-side column graphs for two categorical variables (ACMSP147)** • *Interpret secondary data presented in digital media and elsewhere (ACMSP148)**	

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At Year 5:

Understanding *includes making connections between representations of numbers, using fractions to represent probabilities, comparing and ordering fractions and decimals and representing them in various ways*

Fluency *includes choosing appropriate units of measurement for calculation of perimeter and area, using estimation to check the reasonableness of answers to calculations and using instruments to measure angles*

Problem Solving *includes formulating and solving authentic problems using numbers and measurements, creating transformations and identifying line and rotational symmetries*

Reasoning *includes investigating strategies to perform calculations efficiently, creating financial plans, interpreting results of chance experiments and interpreting data sets*

At Year 6:

Understanding *includes describing properties of different sets of numbers, using fractions and decimals to describe probabilities, representing fractions and decimals in various ways and describing connections between them, and making reasonable estimations*

Fluency *includes representing negative numbers on a number line, calculating simple percentages, using brackets appropriately, converting between fractions and decimals, using operations with fractions, decimals and percentages,*

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 5 and 6 of the AC (VELS Level 4) this can include:

- Recognition and investigation of the use of mathematics in real (for example, determination of test results as a percentage) and historical situations (for example, the emergence of negative numbers)

- Developing and testing conjectures, understanding that a few successful examples are not sufficient proof and recognising that a single counter-example is sufficient to invalidate a conjecture. For example, in:
    - Number (all numbers can be shown as a rectangular array)
    - Computations (multiplication leads to a larger number)
    - Number patterns (the next number in the sequence 2, 4, 6 … must be 8)
    - Shape properties (all parallelograms are rectangles)
    - Chance (a six is harder to roll on die than a one).

- Use of the mathematical structure of problems to choose strategies for solutions. Explaining reasoning and procedures and interpreting solutions. Creating new problems based on familiar problem structures

- Investigation involving mathematical modelling.

- Use of calculators and computers to investigate and implement algorithms (for example, for finding the lowest common multiple of two numbers), explore number facts and puzzles, generate simulations (for example, the gender of children in a family of four children), and transform shapes and solids.

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measuring using metric units, and interpreting timetables	
Problem Solving *includes formulating and solving authentic problems using numbers and measurements, creating similar shapes through enlargements, representing secondary data, and calculating angles*	
Reasoning *includes explaining mental strategies for performing calculations, describing results for continuing number sequences, investigating new situations*	