**Australian MATHEMATICS Curriculum, F-10:**

**Proficiency Strands: Understanding, Fluency, Problem Solving and Reasoning**

**Content Strands: Number & Algebra, Measurement & Geometry, Statistics & Probability**

**For this level, Year 7 Maths Students:**

* **Understanding** includes describing patterns in uses with indices with whole numbers, recognizing commonalities between fractions, decimals, percentages & ratios, plotting points on the Cartesian plane, identifying angles formed by a transversal crossing a pair of parallel lines, & connecting the laws & properties of numbers to algebraic terms & expressions
* **Fluency** includes calculating accurately with integers, representing fractions & decimals in various ways, investigating best buys, evaluating measures of central tendency & calculating areas of shapes & volumes of prisms
* **Problem Solving** includes formulating & solving authentic problems using numbers & measurements, creating transformations & identifying symmetry, calculating angles & 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 & interpreting data displays

\*This document intends to assist teachers in their implementation of the Australian curriculum – it is merely an attempt to understand the document at this time – it combines description and elaboration statements. Teachers are advised to consult the online documentation to clarify further detail for themselves. The ‘AusVELS’ to be released during 2011 will be the official documentation for Victorian schools.

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| **Number & Algebra:** | **Measurement & Geometry:** | **Statistics & Probability:** |
| **Number & place value:**   * Investigate index notation & represent whole numbers as products of powers of prime numbers – *defining & comparing prime & composite numbers; express whole numbers as products or powers of prime factors (repeated division by prime factors, factor trees); solving problems (lowest common multiples & greatest common divisors/highest common factors) for pairs of whole numbers (comparing prime factorization)* * Investigate & use square roots of perfect square numbers – *eg. 25, 36 & develop square – root notation; between which two whole numbers a square root lies* * Apply the associative, commutative & distributive laws to aid mental & written computation – *understand that arithmetic laws describe & simplify calculations* * Compare, order, add & subtract integers   **Real numbers:**   * Compare fractions using equivalence, locate & represent fractions & mixed numerals on a number line – *use fraction wall or number line to explore equivalence among families of fractions (eg. 2/3 same as 4/6 & 6/9)* * Solve problems involving addition & subtraction of fractions, including those with unrelated denominators – *eg. Use fraction walls or rectangular arrays with dimensions equal to the denominators to solve additive problems* * Multiply & divide fractions & decimals using efficient written strategies & digital technologies – *eg. Patterning & multiplication as repeated addition, identify division as inverse of multiplication* * Express one quantity as a fraction of another, with & without the use of digital technologies – *use authentic examples & understand the reasons for the calculations* * Round decimals to a specified number of decimal places – *use rounding to estimate & understand conventions for rounding* * Connect fractions, decimals & percentages & carry out simple conversions – *quantities in different number types, various operations to calculate & choices about these; justify choices of written, mental or calculator strategies* * Find percentages of quantities & express one quantity as a percentage of another, with & without digital technologies – *use authentic problems to express quantities as percentages of other amounts* * Recognise & solve problems involving simple ratios – *rate & ratio problems can be solved by using fractions or percentages, use most efficient method*   **Money & Financial maths:**   * Investigate & calculate ‘best buys’, with & without digital technologies – *apply unitary method, eg. Compare cost per 100g.*   **Patterns & algebra:**   * Introduce concept of variables as a way of representing numbers using letters – *eg. Arithmetic laws lead to generality of algebra* * Create algebraic expressions & evaluate them by substituting a given for each variable– *using authentic formulas to perform substitutions* * Extend & apply the laws & properties of arithmetic to algebraic terms & expressions – *identify order of operations, preserve order by inserting brackets, recognize how order is preserved by convention; move fluently between algebraic & word representations as descriptions of the same situation*   **Linear & non-linear relationships:**   * Given coordinates, plot points on the Cartesian plane, & find coordinates for a given point – *eg. From a table of integer values & recognize patterns, such as points on a straight line* * Solve simple linear equations – *solve using concrete materials such as balance model, & explain need to do same thing to each side of equation; use substitution to check solutions; use strategies like backtracking & guessing, to improve & solve equations; solve real life problems using pronouns to represent unknowns; estimate answers, solve & check solutions & create linear relationships to represent the answer / sequence of operation* * Investigate, interpret & analyse graphs from authentic data – eg. *travel graphs to investigate distance to & from school; interpret features of travel graphs such as slope lines & meaning of horizontal lines; use evaporation graphs to explore water storage* | **Using units of measurement:**   * Establish the formulas for areas of rectangles, triangles & parallelograms & use these in problem solving – *build on knowledge of area of rectangles to develop formulas for area of triangles, using manual strategies & digital technologies; establish that area of triangle is half area of appropriate rectangle & use formula A= 1/2bh, where b = base & h= perpendicular height of the triangle; use area formulas for rectangles & triangles to solve areas of surfaces eg. How many litres of paint needed to paint shed wall of 16m2* * Calculate volumes of rectangular prisms – *investigate volumes of cubes & rectangular prisms, establish & use the formula*   *V=l x b x h ; understand & use cubic units when interpreting & finding volumes of these*  **Shape:**   * Draw different views of prisms & solids formed from combinations of prisms– *use aerial views of buildings & other 3-D structures to visualise the structure of the building or prism*   **Location & transformation:**   * Describe translations, reflections in an axis, & rotations of multiples of 90**°** on the Cartesian plane using coordinates. Identify line & rotational symmetries – *understand transformations to help identify the movement of shapes (rotational line & symmetry); describe patterns & find different ways to produce the same transformational changes eg. Use two successive reflections to provide same as a translation, or use digital technologies to create & re-create patterns using combinations of flips, slides, turns & enlargements or reductions; build on student knowledge of reflection s& rotation of figures & symmetry to identify combinations of transformations that produce the same result & how maths results can be obtained using alternative methods*   **Geometric reasoning:**   * Identify corresponding, alternate & co-interior angles when two parallel straight lines are crossed by a transversal – *define & classify angles as acute, right, obtuse, straight, reflex & revolution, & pairs of angles such as complementary, supplementary, adjacent & vertically opposite; construct parallel & per-pendicular lines using their properties, a pair of compasses & a ruler, & dynamic geometry software* * Investigate conditions for two lines to be parallel & solve simple numerical problems using reasoning – *defining & classifying alternate, corresponding & allied angles & relationships between them for a pair of parallel lines cut by a transversal, including using geometry software* * Classify triangles according to their side & angle properties & describe quadrilaterals –*scalene, isosceles, right-angled & obtuse-angled; describe squares, rectangles, rhombuses, parallelograms, kites & trapeziums* * Demonstrate that the angle sum of a triangle is 180**°** & use this to find the angle sum of a quadrilateral – *using concrete materials & digital technologies, investigate the angle sum of triangles & quadrilaterals* | **Chance:**   * Construct sample spaces for single step experiments with equally likely outcomes – *distinguish between ‘equally likely’ outcomes & others; discuss meaning of probability terminology, eg. Probability, sample space, favorable outcomes, trial, chance events & experiments* * Assign probabilities to the outcomes of events & determine probabilities for events – *express probabilities in common & decimal fraction & percentage forms; understand the advantages & limitations of calculating theoretical probabilities*   **Data representation & interpretation:**   * Identify & investigate issues involving continuous or large count data collected from primary & secondary sources – *investigate secondary data sets to answer comparative questions (eg. Most common country of birth for a class in a Chinese school or a school in the Philippines; investigate relationship between wealth or education & health of populations from different countries* * Construct & compare a range of data displays including stem-&-leaf plots & dot plots – *understand that some representations are more appropriate for particular data sets, & answering questions about those data sets; use ordered stem-&-leaf plots to record & display data from a class investigation eg. class height in centimetres with the stems 12,13,14,15,16,& 17 being provided* * Calculate the mean, median, mode & range for sets of data. Interpret these statistics in the context of data – *understand that summarizing by calculating centre & spread can help make sense of data; calculate mean areas set aside for parkland, manufacturing, retail & residential to compare land use in local municipality* * Describe & interpret data displays & the relationship between the median & mean – *using mean & median to compare data sets & explaining how outliers may affect comparisons; locating mean, median & range on graphs & connecting them to real life* |