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

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

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

**For Year 8 Maths Students:**

* **Understanding** includes describing patterns in uses of indices and repeating decimals, identifying commonalities between operations with algebra & arithmetic, connecting rules of relations & functions & their graphs, explaining the function of statistical measures, & contrasting measurements of perimeter & area
* **Fluency** includes calculating accurately with simple decimals, indices & integers, recognizing equivalence of common decimals & fractions including repeating decimals, factorizing & simplifying basic algebraic expressions, evaluating perimeters, areas 7 volumes of common shapes, & calculating the mean & median of small sets of data
* **Problem Solving** includes formulating & modeling, with comparisons of ratios, profit & loss, authentic situations involving areas & perimeters of common shapes & analyzing & interpreting data using two-way tables
* **Reasoning** includes justifying the result of a calculation or estimation as reasonable, explaining formal & intuitive use of ratios for comparing rates & prices, deriving one probability from its component, using congruence to deduce properties of triangles, & making inferences about data

\*This document intends to assist teachers in their understanding 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:**   * Use index notation with numbers to establish the index laws with positive integral indices & the zero index – *evaluating numbers expressed as powers of positive integers* * Carry out the four operations with integers, using efficient mental & written strategies & appropriate digital technologies   **Real numbers:**   * Investigate terminating & recurring decimals – *recognizing terminating, recurring & non-terminating decimals & choosing appropriate representations* * Investigate the concept of irrational numbers, including π– *real number system includes irrational numbers & certain subsets of the system have particular properties* * Solve problems involving the use of percentages, including % increase & decrease, with & without digital technologies – *eg. use % to solve problems, including mark-ups, discounts, profit & loss, GST* * Solve a range of problems involving rates & ratios, with & without digital technologies – *understanding that these problems can be solved using fractions or %, choosing most efficient form eg. calculating population rates in Australia & Asia & explaining their difference*   **Money & Financial maths:**   * Solve problems involving profit & loss, with & without digital technologies – *profit & loss as % of cost of selling price, comparing difference*   **Patterns & algebra:**   * Extend & apply the distributive law to the expansion of algebraic expressions– *eg. strategies such as the area model* * Factorise algebraic expressions by identifying numerical factors– *recognizing that factorizing is the opposite of expanding; identifying greatest common divisor (highest common factor & using variety of strategies to factorise algebraic expressions* * Simplify algebraic expressions involving the four operations – *arithmetic laws are powerful ways of describing & simplifying calculations (using them leads to the generality of algebra); laws that apply to number can be generalized using variables*   **Linear & non-linear relationships:**   * Plot linear relationships on the Cartesian plane with & without the use of digital technologies– *eg. plot points for tables of values from non-rule based data, such as water consumption over a month* * Solve linear equations using algebraic & graphical techniques. Verify solutions by substitution – *use variables to symbolize simple linear equations & use a variety of strategies to solve them; solve equations using concrete materials, such as balance model, & explain need to do same thing to each side of equation; use strategies such as backtracking & guess, to check & improve to solve equations* | **Using units of measurement:**   * Choose appropriate units of measurement for area & volume & convert from one unit to another – *choosing units eg. mm2, cm2, m2, hectares & units for volume, mm3, cm3, m3; recognizing that the conversion factors for area units are the squares of those for the corresponding linear units & conversion factors for volume are the cubes of those for the corresponding linear units* * Find perimeters & areas of parallelograms, rhombuses & kites – *explore use of each of these in art & architecture* * Investigate the relationship between features of circles such as circumference, area, radius & diameter. Use formulas to solve problems involving circumferences and area – *investigate with materials or by measuring, to understand formulas; use a square grid or rearrange sectors of circles to investigate area of circles* * Develop the formulas for volumes of rectangular & triangular prisms & prisms in general. Use formulas to solve problems involving volume – *relationship between volumes of rectangular and triangular prisms* * Solve problems involving duration, including using 12- and 24- hour time within a single time zone – *identify regions in Australia & countries in Asia that are in the same time zone*   **Geometric reasoning:**   * Define congruence of plane shapes using transformation – *understand the properties that determine congruence of triangles & recognizing which transformations create congruent figures; establish that two figures are congruent if one shape lies exactly on top of the other after one or more transformations (translation, reflection, rotation) & recognize equivalence of corresponding sides & angles* * Develop the conditions for congruence of triangles – *construct triangles using conditions for congruence; solve problems for congruent figures, justifying reasoning & making generalisations; investigate minimal conditions for unique construction of triangles, leading to conditions of congruence (SSS, SAS, ASA & RHS), demonstrate which conditions do not prescribe congruence (ASS, AAA); plot vertices of two-dimensional shapes on Cartesian plane, translate, rotate or reflect the shape & use coordinates to describe the transformation* * Establish properties of quadrilaterals using congruent triangles & angle properties, & solve related numerical problems using reasoning – *establish properties of squares, rectangles, parallelograms, rhombuses, trapeziums & kites; identify properties related to side lengths, parallelism, angles, diagonals & symmetry* | **Chance:**   * Identify complementary events & use the sum of probabilities to solve problems – *understand that probabilities range between 0 to 1 & that calculating the probability of an event allows the probability of its complement to be identified; eg heads or tails, winning a game or not winning* * Describe events using language of ‘at least’, exclusive ‘or’ (A or B but not both), inclusive ‘or’ (A or B or both) and ‘and’ – *posing ‘and’, ’or’, ‘not’, & ‘given’ probability questions about objects or people* * Represent such events in two-way tables and Venn diagrams & solve related problems – *understand that representing in two-way tables or Venn diagrams facilitates calculation; use these to calculate probabilities for events, satisfying ‘and’, ‘or’, ‘given’ & ‘not’ conditions; collect data in two-way tables & Venn diagrams to answer questions*   **Data representation & interpretation:**   * Explore the practicalities & implications of obtaining representative data using a variety of investigative processes – *understand that making decisions & drawing conclusions based on data may differ from those based on preferences & beliefs; investigate international issue where media reporting & use of data reflects different cultural or social emphases (eg. whaling, football World Cup outcomes)* * Explore the variation of means & proportions in representative data * Investigate the effect of individual data values, including outliers, on the mean and median – *using sample properties (mean, median, range, large gaps visible on a graph) predict characteristics of the population (eg. using mean height for a class to predict year-group mean height) acknowledging uncertainty; use displays of data to explore & investigate effects* |