| **SCOPE AND SEQUENCE** | | | Mathematics — Years 1 to 9 | | | | **ALGEBRA** | |  | | | | **DRAFT** |
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| **Scope and sequence** identifies what should be taught and what is important for students to have opportunities to learn. It describes the *knowledge* that students need for ongoing learning in Mathematics.  This knowledge is presented as *Concepts and facts* and *Procedur*es.  The scope and sequence:   * is provided for each year of schooling * should be used together with the *Essential Learnings* * provides additional detail in each Organiser * informs the focus of Mathematics in assessment * is a key document for school curriculum planning. | | | | | | | | | | | | | |
| **Prep** | **Year 1** | **Year 2** | | **Year 3** | **Year 4** | **Year 5** | | **Year 6** | | **Year 7** | **Year 8** | **Year 9** | |
| ***Concepts and facts*** | ***Concepts and facts*** | ***Concepts and facts*** | | ***Concepts and facts*** | ***Concepts and facts*** | ***Concepts and facts*** | | ***Concepts and facts*** | | ***Concepts and facts*** | ***Concepts and facts*** | ***Concepts and facts*** | |
| * Own patterns * Repeating patterns have a discernible unit of repetition * Non-patterns * “Balance” on scales * Sameness of collections (equivalence) | * Simple rules for repeating patterns () and increasing patterns () * Inverse of the rule, e.g. subtraction undoes addition * Equivalence collections | * Repeating patterns * Increasing and decreasing patterns:   + skip counting   + repeated addition, or subtraction * Missing values in patterns * Simple rules:   + pattern of 2, 3, 4, or 5 objects (repeating patterns)   + based on addition or subtraction   + (increasing and decreasing patterns) * Equivalent collections: different combinations and arrangements for the same number value, e.g. 5 and 3 and 4 and 4 are equivalent * Non-patterns, patterns with errors | | * Number patterns and sequences:   + repetition, order   + regular increases and decreases   + rules based on previous terms     - Simple relationships between objects and numbers:   + order (the second value depends on, is a function of the first value)   + sequence   + arrangement   + equivalence | * Space and number pattern rules, including patterns with decimals * Relationships between quantities including equivalence * Arithmetic properties:   + commutative   + associative   + distributive * Inverse operations | * Number pattern rules using the four operations * Predictions of change using relationships, e.g. with the previous term as in the Fibonacci sequence * Generalisations built on:   + commutative property   + associative property   + distributive property   + inverse operations | | * Equations using addition, subtraction * Order of operations: the appropriate sequence of operations used in calculations * Input–output rules * Ordered pairs (discrete data) * Relationships:   + variables   + simple equations | | * Equations, expressions and formulae using addition, subtraction and multiplication * Order of operations * Ordered pairs (continuous data) * Relationships:   + variables   + equations | * Equations * Algebraic expressions involving the four operations * Variables (discrete and continuous) and constants * Ordered pairs (four quadrants) * Linear and non-linear equations related to real-life problems | * Algebraic expressions involving reciprocals, whole number powers and square roots * Algebraic relationships modelled using integer, decimal and fraction values of variables * Functions * Simple simultaneous linear and non-linear equations | |
| ***Procedures*** | ***Procedures*** | ***Procedures*** | | ***Procedures*** | ***Procedures*** | ***Procedures*** | | ***Procedures*** | | ***Procedures*** | ***Procedures*** | ***Procedures*** | |
| * Comparison of collections:   + quantity, size * Sorting | * Order * Comparison of collections:   + same as   + different * Translation of patterns: actions to objects | * Order * Comparison of collections:   + balance   + equal to   + same   + different from * Translation of patterns: objects to numbers * Elements or terms of a pattern and the position in the pattern | | * Equations:   + unknowns   + equivalence | * Comparison of data sets | * Comparison of relationship in pictorial and concrete materials, e.g. changes in perimeter with changes in the area | | * Comparisons of simple algebraic expressions and relationships, e.g. energy bars costs $2 each, cost equals number x 2 | | * Comparisons of simple algebraic expressions and relationships, e.g. constant walking speed at  4 km/h | * Comparison of linear and non-linear graphs * Conservation of equivalence | * Conservation of equivalence | |
| * Estimation | * Estimation * Mental strategies:   + guess and check | * Estimation * Mental strategies:   + guess and check   + backtracking (inverse relationship between addition and subtraction) | | * Estimation * Mental strategies:   + guess and check using addition and subtraction   + backtracking | * Estimation * Mental strategies:   + guess and check   + inverse of operations (addition and subtraction, multiplication and related division facts)   + backtracking | * Estimation * Mental strategies:   + guess and check   + inverse of operations (addition and subtraction, multiplication and division)   + simplify, manipulate and calculate expressions, e.g. 72 ÷ 3 is the same as 60 ÷ 3 plus 12 ÷ 3   + backtracking | | * Estimation * Mental and written strategies:   + guess and check   + equivalence   + backtracking | | * Estimation * Mental and written strategies:   + guess and check   + commutative property   + associative property   + distributive property   + inverse property | * Estimation * Mental, electronic and written strategies:   + for manipulation of expressions and equations   + guess and check   + commutative property   + associative property   + distributive property   + inverse property   + substitution   + simplifying   + collecting like terms   + expanding | * Estimation * Mental, electronic and written strategies:   + for manipulation and rearrangement of expressions and equations   + guess and check   + commutative property   + associative property   + distributive property   + inverse property   + substitution   + rearrange, e.g. rearrange  p = 3q – 2 to obtain 3q = (p+2) | |
| * Concrete materials:   + computers   + manipulative materials (everyday objects, balance scales)   + actions, sounds * Verbal:   + increasing and decreasing sequences in songs and rhymes   + predictions of change   + pattern rules   + patterns descriptions   + descriptions of same collections * Written:   + recording patterns, e.g. drawings * Visual:   + photographic records of patterns | * Concrete materials:   + computers and other electronic devices   + manipulative materials (everyday objects, balance scales)   + actions, sounds * Verbal:   + same as in groups   + equal to a group   + counting patterns   + backtrack * Written:   + symbolic: equals (=)   + groups of repeating elements   + electronic * Visual:   + photographic records of patterns | * Concrete materials:   + computers and other electronic devices   + manipulative materials (everyday objects, balance scales)   + actions, sounds   + function machine (input–output) to describe a rule * Verbal:   + simple rules for increasing, decreasing patterns and repeating patterns   + number sentences   + predictions and statements   + the use of an element in patterns, e.g. 12th element in a red, green pattern   + explanations of reasoning, calculation strategies and reasonableness of solutions   + mathematical language: equal to, same as, not equal to, different from, missing addend * Written:   + symbols   + list   + input–output table  |  |  | | --- | --- | | **Input** | **Output** | | No. Apples | Cost | | 1 | 50c | | 2 | $1.00 | | 3 | $1.50 |  * Visual:   + drawings   + calculator constant function   + hundred board   + picture graphs | | * Concrete materials:   + computers and other electronic devices   + manipulative materials (everyday objects)   + function machine, manipulative materials * Verbal:   + descriptions of patterns, rules and relationships   + attributes of equivalence   + generalisations about changes between elements and continuing patterns   + explanations of reasoning, calculation strategies and reasonableness of solutions * Written:   + symbolic: equals (=), does not equal (≠), unknowns (shapes, boxes, question marks, spaces, lines)   + equations in words   + table of values   + graphs * Visual:   + pictorial materials   + calculators   + hundred board   + picture and bar graphs   + lists   + tables | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + rules for spatial and number patterns   + explanations of reasoning, calculation strategies and reasonableness of solutions   + mathematical language: same, different, more, less, equal, not equal, greater than, less than * Written:   + symbolic: greater than (>), less than (<), unknowns (shapes, boxes, question marks, spaces, lines)   + equations   + lists   + tables   + picture and bar graphs * Visual:   + pictorial materials   + graphs   + lists   + tables | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + positions in patterns from rules, e.g. 20th term in the pattern 3, 6, 9, 12 … will be 60 as 20 x 3 = 60   + explanations of reasoning, calculation strategies and reasonableness of solutions * Written:   + symbolic: x/÷, +/-   + equations   + words   + lists   + tables   + line graphs   + graphs (manual and electronic ) * Visual:   + pictorial materials   + graphs   + lists   + tables | | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + strategies for calculations   + descriptions of rules   + predictions   + explanations of reasoning, calculation strategies and reasonableness of solutions   + mathematical language: discrete, continuous, trends * Written:   + symbols and letters   + words   + ordered pairs   + brackets   + graphs (manual and electronic )   + calculations * Visual:   + tables of values   + commercial graphs   + arrow diagrams to sequence procedures | | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + strategies for calculations, and to maintain equivalence   + descriptions of patterns in words, explanations of generalisations, e.g. why (2 x 6) + (3 x 6) = 5 x 6 generalises to (2 x n) + (3 x n) =  5 x n   + predictions   + justifications of reasoning, calculation strategies and reasonableness of solutions * Written:   + symbols and letters   + tables   + ordered pairs   + graphs (manual and electronic)   + calculations   + diagrams and arrow diagrams * Visual:   + tables of values   + other people’s graphs | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + strategies for calculations, and to maintain equivalence   + predictions and generalisations   + justifications of reasoning, calculation strategies and reasonableness of solutions   + mathematical language: variable, dependent, independent, trend * Written:   + symbols and letters   + models   + tables   + ordered pairs   + graphs (manual and electronic )   + calculations   + different representations of linear and non-linear equivalences * Visual:   + tables of values   + commercial graphs | * Concrete materials:   + computers and other electronic devices   + manipulative materials * Verbal:   + strategies for calculations, and to maintain equivalence   + predictions and generalisations   + justifications of reasoning, calculation strategies and reasonableness of solutions   + constant rates of change   + effect of varying values   + reference to gradients and *y* axis   + rule of the function * Written:   + symbols and letters,  e.g. y = mx + c   + models   + tables of values for linear and simple non-linear functions   + ordered pairs   + graphs (manual and electronic )   + calculations   + different representations of linear and non-linear equivalences * Visual:   + commercial graphs | |