SCOPE AND SEQUENCE Mathematics — Years 1 to 9 ALGEBRA DRAFT

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 *Procedures*.

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.

Concepts and facts

Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
▪ 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

Prep	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
▪ 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 ▪ 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 reasoning, 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