| **SCOPE AND SEQUENCE** | Mathematics — Years 1 to 9 | **NUMBER** | **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 knowledgethat 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.
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| **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*** |
| * Familiar whole numbers
* Parts of a whole everyday object, e.g. slice of the cake
* Collections of objects
* Groups of objects in a collection
* Sharing of collections
 | * Whole numbers 0 to 10
* Half of objects and collections
* Quarter as half of half
* Groups of
* Sharing equally
 | * Whole numbers to hundreds
* Place value:
	+ tens
	+ ones
* Half
* Quarter: part of a whole, half of half
* Equal parts of whole objects and equal parts of collections
 | * Whole numbers to 999
* Place value:
	+ hundreds
* Unit fractions:
	+ one half: one of two equal parts of a whole
	+ one quarter: one of four equal parts of a whole
	+ equal parts of a whole
* Mixed numbers (whole number and a fractional part, e.g. 3½ )
 | * Whole numbers to thousands
* Place value
	+ changes when multiplying and dividing by 10 and 100
	+ tenths
	+ thousands
* Equivalent fractions
	+ easily related common fractions, e.g. half and quarter
* Mixed numbers
 | * Whole numbers to 9999
* Place value
	+ to at least hundredths
* Equivalent fractions
	+ easily related third and sixth, fifths, tenths
* Common fractions and mixed numbers involving denominators up to tenths
* Prime numbers (up to at least 20) have only two distinct factors
* Composite numbers have more than two factors
 | * Whole numbers, square numbers, triangular numbers
* Equivalent fractions:
	+ common fractions, decimal fractions and percentages
	+ vinculum as a divisor
* Key percentages: 10%, 20%, 25%, 30%, 40%, 50%, 100%
* Rates express multiplicative relationships between unlike quantities
* Ratio express multiplicative relationships between like quantities
* Direct proportion is the equivalence of two ratios
 | * Positive and negative numbers (integers)
* Powers of 10
* Equivalent fractions
* Percentages
* Rates, e.g. runs per over in cricket
* Ratio, e.g. one part concentrate juice to four parts water
* Direct proportion, e.g. 1:2 and 2:4
 | * Rational numbers (integers, fractions and decimals)
* Irrational numbers (cannot be expressed as a [fraction](http://mathworld.wolfram.com/Fraction.html) p/q for any [integers](http://mathworld.wolfram.com/Integer.html) p and q)
* Upper and lower estimates
* Index notation (whole number indices)
* Square roots
* Rates, e.g. exchange rates for the Australian dollar
* Ratio
* Proportion
* Whole and fractional percentage, greater than 100%
 | * Decimal approximations of irrational numbers, e.g. pi
* Index notation (positive and negative indices)
* Scientific notation for very large and very small numbers, positive and negative powers of 10
* Rate, ratio, proportion and percentage using integers fractions and decimals
 |
|  | * Joining model for addition
* Take away and cover up model for subtraction
* Addition and subtraction of whole number totals to 10, two or more addends
 | * Basic addition facts to 10 and subtraction facts as the inverse
* Addition and subtraction totals to 99, two or more addends, missing addends
 | * Extensions of basic addition facts and subtraction facts as the inverse
* Addition and subtraction totals to 999, two or more addends
 | * Addition and subtraction totals to 9999, two or more addends, missing addends and common fractions, e.g. ½ + ½
 | * Addition and subtraction of whole numbers to 9999, and decimal fractions to hundredths
 | * Addition and subtraction of whole numbers, common fractions and decimal fractions to hundredths
 | * Addition and subtraction
 | * Addition and subtraction of rational numbers, and numbers with indices
 |  |
|  |  | * Arrays, rows of
* Equal groups of
* Sharing parts equally (partition)
* Equal groups (quotition)
 | * Multiplication facts up to 10
* Related division facts using single-digit divisors as the inverse of multiplication facts
 | * Multiplication facts (4s, 8s facts)
* Related division facts as the inverse of multiplication facts
 | * Multiplication and division by whole numbers up to 10
 | * Multiplication and simple division of whole numbers, common fractions and decimal fractions to hundredths
 | * Multiplication and division
 | * Multiplication and division of positive and negative rational numbers
 | * Multiplication and division of rational numbers and numbers with indices
 |
| ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** |
| * Quantity: one-to-one correspondence
* Position and order of numbers relative to other numbers
* Comparison of collections
* Relationship between quantities, e.g. more, less
 | * Quantity: conservation of whole numbers 0 to 10, subitising (seeing groups of 2 or 3 objects without counting)
* Position and order of numbers 0 to 10
* Comparison
* Patterns in numbers:
	+ calculator displays created using constant function
* Relationship between:
	+ numbers, e.g. more, less, same as
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers, to the nearest 5 or 10, ordinal numbers to 10
* Comparison of odd and even numbers
* Patterns in numbers
* Relationship between:
	+ numbers, e.g. more, less, equal to, not equal to
	+ subtraction and addition
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers, to the nearest 5 or 10, and their extensions to 2- and 3-digit numbers
* Comparison of numbers using place value
* Patterns in numbers
* Relationship between:
	+ numbers, e.g. greater than, less than, equivalent to
	+ multiplication and division
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers, to the nearest 5 or 10, and their extensions to 2-, 3- and 4-digit numbers
* Comparison number using place value
* Patterns in numbers involving common and decimal fractions
* Relationship between:
	+ whole numbers
	+ common and decimal fractions and mixed numbers
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers and to zero, to the nearest 5 or 10, and their extensions to 2-, 3- and 4-digit numbers
* Comparison of number using place value
* Patterns in numbers, common, and decimal fractions and mixed numbers
* Relationship between:
	+ multiplication facts (2s, 4s, and 8s, 3s, 6s, and 9s)
	+ place value changes when multiplying and dividing by 10 and 100
	+ whole numbers
	+ common and decimal fractions and mixed numbers
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers, and to zero, to the nearest 5 or 10 and their extensions to 2-, 3- and 4-digit numbers
* Comparison of different number concepts
* Patterns in numbers, common and decimal fractions and percentages
* Relationship between:
	+ numbers
	+ key percentages, common and decimal fractions and mixed numbers,e.g. equivalent fractions for 20%, 1/5, 0.20, and the words, one-fifth
	+ square numbers and the related square root
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers, and to zero, to the nearest 5 or 10 and their extensions to 2-, 3- and 4-digit numbers
* Comparison of different number concepts
* Patterns in numbers, common and decimal fractions and percentages
* Relationship between:
	+ positive and negative integers
	+ common fraction, decimal fraction and percentage
 | * Quantity: groups using place value
* Position and order of numbers relative to other numbers
* Patterns in rational numbers
* Relationships between:
	+ squares and square roots
	+ upper and lower estimates
 | * Quantity: groups using place value
* Position and order of rational numbers relative to other numbers
* Patterns in rational numbers
* Relationships between:
	+ numbers
	+ scientific notation and other representations
 |
| * Mental strategies:
	+ student-generated,e.g. appropriate strategies different from the typical
 | * Estimation
* Mental strategies:
	+ count on, count back in 1s, 2s, and 3s
	+ commutativity of addition (turn around), e.g. when calculating 2 + 7 start with 7 and add 2
	+ make to 10
	+ breaking up numbers to make them manageable, e.g. 7 add 5, break up 5, add 3, make to 10 then add 2
	+ student-generated
 | * Estimation
* Mental strategies:
	+ count back in 1, 2, and 3
	+ make to 100
	+ doubles and near doubles
	+ skip counting in 2s, 5s, 10s
	+ student-generated
 | * Estimation
* Mental strategies:
	+ related facts, e.g. calculate 14 take 8 by recalling 8+6 equals 14
	+ build up, build down to preferred reference point, e.g. to the nearest decade or 100
	+ extensions of count on and count back strategies from single-digit facts to 2- and 3-digit numbers
	+ doubles (x 2), double doubles (x 4)
	+ skip counting (x 2, x 5, x 10)
	+ inverse operations
	+ student-generated
 | * Estimation strategies for operations
* Mental strategies:
	+ inverse operations
	+ manageable numbers
	+ extensions of basic number facts, e.g. 6 + 3 = 9 extension of basic fact 600 + 300 = 900
	+ doubles (x 2), double doubles (x 4), double double doubles (x 8)
	+ multiplying and dividing by 10 and 100
	+ common denominators
	+ student-generated
 | * Estimation strategies for operations
	+ familiar reference points, 5, 10, tens, hundreds, thousands
	+ place value strategies
	+ manageable numbers
* Mental strategies:
	+ inverse (backtracking)
	+ doubles (x 2), double doubles (x 4), double double doubles (x 8)
	+ build up (x 7 facts), build down (x 9 facts)
	+ halving
	+ student-generated
 | * Estimation of number values
* Mental and written strategies:
	+ inverse (backtracking)
	+ links between common fractions, decimal fractions and percentages
	+ factors of numbers, e.g. 27 x 3 = 9 x 3 x 3 = 9 x 9 = 81
 | * Estimation and rounding based on powers of 10
* Mental and written strategies:
	+ rates, direct proportion
	+ inverse (backtracking)
 | * Estimation: upper and lower boundaries
* Mental, electronic and written strategies:
	+ index laws with whole number indices
	+ rates, ratio, proportion
	+ inverse (backtracking)
 | * Estimation: upper and lower boundaries
* Mental, electronic and written strategies:
	+ conventions of four operations
	+ index laws with positive and negative indices
	+ inverse (backtracking)
 |
| * Concrete materials:
	+ computers
	+ manipulative materials (random placement, patterns, and in a line)
* Verbal:
	+ counting (forward to 10, backward in 1s from 5, next number in the chant of the counting sequence, e.g. 1,2,3,4,?)
	+ more, less
	+ everyday language: slice, piece, number names 0 to 10
* Visual:
	+ pictures of collections
	+ five frame
	+ blank number line
	+ number chart to 10
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (random placement, in a line patterns, pairs, three in a row, domino pattern, quantity of number, e.g. four is four objects or three balls and one bat or two balls and two bats)
* Verbal:
	+ counting (forward to 100, forward in 2s to 20, backward in 1s from 10)
	+ operation to be used
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ mathematical language: add, take away and ways to calculate, cover up, part, whole, number names 0 to 10
* Written:
	+ symbolic: add (+), subtract (-)
	+ words and electronic for number patterns, e.g. + 1, + 2, + 3, jottings for calculations
* Visual:
	+ pictures
	+ five frame, ten frame
	+ number line
	+ number chart to 100
	+ subitising (seeing groups of two or three objects and patterns of larger numbers without counting), e.g. five domino pattern
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (groups of 5 and 10, rows of 2 or 3, different combinations of numbers to same value)
* Verbal:
	+ counting (forward in 2s, 5s, 10s to 100, strategies for operations counting from different numbers, extensions to larger numbers, backward in 1s from any number)
	+ operation to be used
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ mathematical language: number names to 100, fraction names, add, subtract, left, multiply and divide, groups of, rows of, jumps of, share between, share, odd, even
* Written:
	+ symbolic: equals (=), does not equal (≠)
	+ words and electronic
	+ calculations for the operations with and without electronic devices
* Visual:
	+ pictures
	+ five frame, ten frame
	+ number line
	+ number chart to 100
	+ subitising
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (number patterns, different combinations of numbers to equivalent value, sharing materials into groups and making groups)
* Verbal:
	+ counting (forward in 10s, 100s to three-digit numbers, extensions to larger numbers, backwards in 100s and 10s, counting on from different numbers)
	+ operation to be used
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ explanations about why one number is smaller or larger based on place value, link different symbolic representations of numbers, fractions and mixed numbers
	+ mathematical language: number names to 999, fraction names, add, subtract, multiply and divide, arrays, equal groups of
* Written:
	+ symbolic: multiply (x), divide (÷), fractions, greater than (>), less than (<)
	+ calculations for the operations with and without electronic devices
	+ sketches
* Visual:
	+ pictures
	+ number line
	+ number chart of skip counting patterns for and from different numbers, e.g. 3
	+ arrays
	+ equal groups
	+ pictorial of fractions, e.g. clock faces, electronic
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (different combinations of numbers, fractions of objects, parts of collection, parts of measures)
* Verbal:
	+ counting (extensions to larger numbers)
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ mathematical language: number names to thousands, fraction names, decimal names, multiples, factors
* Written:
	+ symbolic: fractions
	+ words and electronic
	+ calculations for the operations with and without electronic devices
	+ number patterns on number lines
* Visual:
	+ number line
	+ number chart
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (collections of objects, parts of collections, parts of measures, number patterns, different representations, e.g. area, set and linear models)
* Verbal:
	+ counting
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ mathematical language: number names to 9999, numerator, denominator, vinculum
* Written:
	+ symbolic: fractions, multiply (\*), divide (/)
	+ words and electronic
	+ calculations for the operations with and without electronic devices
* Visual:
	+ number line
	+ fraction walls
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials (different materials for similar purposes, e.g. MAB)
* Verbal:
	+ counting (fractions, e.g. ⅓, ⅔, 1, 1⅓)
	+ estimates
	+ explanations of reasoning
	+ calculation strategies and reasonableness of solutions
	+ mathematical language: percentage
* Written:
	+ index notation for square numbers, e.g. 6x6, (62 )
	+ symbolic: vinculum as a divisor, percentage (%)
	+ words, abbreviations, e.g. 20K/20 000, $1.5m/$1.5 million, $3b/$3 billion and electronic devices
	+ calculations for the operations with and without electronic devices
	+ estimates
* Visual:
	+ number line
	+ percentages on area grids
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials
* Verbal:
	+ estimates
	+ justifications of reasoning
	+ calculation strategies and reasonableness of solutions
* Written:
	+ symbolic: conventional notation for fractions including improper fractions and powers, ratio (:)
	+ words and electronic, e.g. spreadsheets
	+ calculations for the operations with and without electronic devices
	+ estimates of negative numbers on number lines
* Visual:
	+ number line
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials
* Verbal:
	+ estimates and approximations
	+ justifications of reasoning
	+ calculation strategies and reasonableness of solutions
* Written:
	+ symbolic: conventions of the four operations including brackets
	+ calculations for the operations with and without electronic devices
	+ estimates
	+ conversions between different representations of rational numbers
* Visual:
	+ number line
	+ factor trees
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials
* Verbal:
	+ estimates for square roots, whole number and decimal approximations
	+ justifications of reasoning
	+ calculation strategies and reasonableness of solutions
* Written
	+ symbolic: conventions of the four operations including brackets and indices
	+ calculations for the operations with and without electronic devices
	+ scientific notation on scientific calculators as 1.99 E8
	+ graphical representations of direct proportions
* Visual:
	+ “real number” line
	+ factor trees
 |
| ***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*** |
| * Money for goods or services, e.g. bus fare, saving and spending
 | * Purchase price for goods and services
 | * Equivalent value of coins and notes
 | * Estimation of close values,e.g. using $5 note when the cost is $4.75
 | * Available money
	+ saving plans
	+ spending plans, equivalent amounts
 | * Income: household
* Household budget
* Saving, borrowing, interest and fees
* Spending, transaction fees on cards
 | * Factors influencing financial decisions, transactions and spending:
	+ value for money
	+ budget
	+ percentage discounts
	+ methods of payment, e.g. EFTPOS, credit and debit cards cash
	+ available income or savings
 | * Factors influencing financial decisions, transactions and spending:
	+ value for money
	+ budget
	+ methods of payment, e.g. EFTPOS, credit and debit cards, cheques and money orders
	+ available income or savings
	+ interest
 | * Factors influencing financial decisions, transactions and expenditure
* Income: rates of pay
* Cash, credit and debit transactions:
	+ benefits
	+ consequences
* Fees and charges
	+ organisations
 | * Factors influencing financial decisions, transactions and expenditure
* Cash, credit and debit transactions:
	+ cost-benefit analysis
* Fees and charges
* Governments, e.g. goods and services taxes
 |
| ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** | ***Procedures*** |
| * Comparison and sorting
 | * Comparison and classification
 |  |  |  |  |  |  |  |  |
| * Concrete materials:
	+ computers
	+ manipulative materials, dollar coins, $5, $10 notes, financial transaction cards
* Verbal:
	+ everyday language: names of dollar coins and $5, $10 notes
* Visual:
	+ features of coins and notes $1, $2 coins, $5, $10
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, coins and notes, financial transaction cards
* Verbal
	+ everyday language: names of coins and notes, cost, price
* Written:
	+ conventions for representing money
* Visual:
	+ features of coins to 2 dollars, notes to $100
	+ advertising
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, coins and notes, financial transaction cards
* Verbal:
	+ everyday language: names of coins and notes, advertised price, purchase price
* Written:
	+ conventions for representing money
* Visual:
	+ features of coins, notes
	+ advertising
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, coins and notes, financial transaction cards
* Verbal:
	+ everyday language: names of coins and notes, change
* Written:
	+ conventions for representing money
* Visual:
	+ advertising prices
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, coins and notes, financial transaction cards
* Verbal:
	+ everyday language: names of coins and notes, change
* Written:
	+ simple financial records, e.g. list of expenditure with the leftover balances from savings, simple electronic spreadsheet
	+ conventions for representing money and calculator displays, e.g. 2.8 display means $2.80
* Visual:
	+ prices with fees
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, coins and notes, financial transaction cards
* Verbal:
	+ everyday language: names of coins and notes, change
* Written:
	+ simple financial records
	+ calculator displays, e.g. 2.8 display means $2.80
	+ financial records, spending and saving plans
* Visual:
	+ prices
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, credit and debit cards
* Written:
	+ budgets
	+ financial records,e.g. table of savings, expenses and balances, electronic spreadsheet
	+ conventions for percentage discounts
* Visual:
	+ prices with discounts
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, credit and debit cards and money orders
* Written:
	+ budgets
	+ financial records
	+ cheques
	+ conventions for percentage discounts
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, credit and debit brochures
* Written:
	+ conventions for percentage discounts
* Visual:
	+ lists
	+ tables
 | * Concrete materials:
	+ computers and other electronic devices
	+ manipulative materials, State and Federal Government financial publications
* Written:
	+ lists
	+ tables
	+ graphs
* Visual:
	+ lists
	+ tables
	+ graphs
 |