Reception to Year 6

Mathematics

September 2022

Scope and sequence

Revised to align with the Australian Curriculum V9.0 (2022)

V2.0

Government of South Australia
Department for Education

Mathematics: Reception to year 6

Contents

Context statement

The Mathematics curriculum is organised around the interaction of 6 content strands and 4 proficiency strands. The content strands are:

- number
- algebra
- measurement
- space
- statistics
- probability

The Mathematics curriculum is taught through the proficiency strands of understanding, fluency, problem-solving and reasoning. They indicate the breadth of mathematical actions that teachers can emphasise. They describe how content is explored or developed.

Mathematics aims to instil in students an appreciation of the elegance and power of mathematical reasoning. Students are reasoning mathematically when they explain their thinking, when they deduce and justify strategies used and when they compare and contrast ideas and explain their choices.

Links between the various components of mathematics, are made clear and taught as interconnected skills.

Students need to be supported to build a robust knowledge of adaptable and transferable mathematical concepts. They need to make connections between related concepts and become confident, creative users and communicators of mathematics.

The South Australian Mathematics Scope and Sequence R to 10:

- provides the achievement standards positioned within related strands; number, algebra, measurement, space, statistics, and probability
- makes the relationship between achievement standards and content explicit by listing the achievement standards with the relevant content descriptions
- emphasises the progression of skills by highlighting the verbs to emphasise the development of skills across the curriculum
- supports clarity by breaking achievement standards into dot points
- provides the sequence of content and sequence of achievement
- includes content descriptions listed, followed by associated elaborations to support clarification of content and provide examples of the mathematics in context.

Each of the 6 strands have been further divided into 'sub-organisers' to display the clear progression of concepts from Reception to Year 6. The sub-organisers are as follows:

- Number: Place value, calculation strategies, estimation strategies, number properties, mathematical modelling, and fractions, decimals, and percentages.
- Algebra: Repeating patterns, number patterns, algorithms, and numerical equations.
- Measurement: Using units of measurement, measuring length, mass, and capacity, angles, and duration of time and telling time.
- Space: Classifying and comparing shapes, location, and transformation.
- Statistics: Representing and interpreting data, and statistical investigation.
- Probability: Chance and events, and experiments and simulations.

Achievement standards

Strand: Number

The *Number* strand develops ways of working with mental constructs that deal with correspondence, magnitude and order, for which operations and their properties can be defined. Numbers have wide ranging application and specific uses in counting, measuring and other means of quantifying situations and objects. Number systems are constructed to deal with different contexts and problems involving finite and infinite, discrete and continuous sets. Developing number sense and the ability to work effectively with numbers is critical to being an active and productive citizen who is successful at work and in future learning, who is financially literate, and who engages with the world and other individuals.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
By the end of reception, students: • make connections between number names, numerals and position in the sequence of numbers from zero to at least 20 • use subitising and counting strategies to quantify collections • partition and combine collections up to 10 in different ways, representing these with numbers • compare the size of collections to at least 20 • represent practical situations that involve quantifying, equal sharing, adding to and taking away from collections to at least 10.	By the end of year 1, students: • connect number names, numerals and quantities, and order numbers to at least 120 • partition collections into equal groups and skip count in twos, fives or tens to quantify collections to at least 120 • demonstrate how one- and two-digit numbers can be partitioned in different ways and that two-digit numbers can be partitioned into tens and ones • solve problems involving addition and subtraction of numbers to 20. • use mathematical modelling to solve practical problems involving addition, subtraction, equal sharing and grouping, through use of calculation strategies.	By the end of year 2, students: • order and represent numbers to at least 1000 • apply knowledge of place value to partition, rearrange and rename two- and three-digit numbers in terms of their parts • regroup partitioned numbers to assist in calculations • use mathematical modelling to solve practical additive and multiplicative problems, including money transactions, represent the situation and choose calculation strategies. • recall and demonstrate proficiency with addition and subtraction facts within 20 and multiplication facts for twos. • Identify and represent part-whole relationships of halves, quarters and eighths in measurement contexts.	By the end of year 3, students: • order and represent natural numbers beyond 10 000 • partition, rearrange and regroup two- and three-digit numbers in different ways to assist in calculations • use and extend single-digit addition and related subtraction facts • apply additive strategies to model and solve problems involving two- and three-digit numbers • use mathematical modelling to solve practical problems involving single-digit multiplication and division • make estimates and determine the reasonableness of financial and other calculations • represent unit fractions and their multiples in different ways.	By the end of year 4, students: • use their understanding of place value to represent tenths and hundredths in decimal form and to multiply natural numbers by multiples of 10 • use their proficiency with addition and multiplication facts to add and subtract, multiply and divide numbers efficiently • choose rounding and estimation strategies to determine whether results of calculations are reasonable • use the properties of odd and even numbers • use mathematical modelling to solve financial and other practical situations, formulate the problem using number sentences, solve the problem, choose efficient strategies and interpret results in terms of the situation • recognise equivalent fractions and make connections between	By the end of year 5, students: • use place value to write and order decimals including decimals greater than one • use their proficiency with multiplication facts and efficient calculation strategies to multiply large numbers by one- and two-digit numbers and divide by single-digit numbers • check the reasonableness of their calculations using estimation • express natural numbers as products of factors and identify multiples • use mathematical modelling to solve financial and other practical problems, formulate and solve problems, choose arithmetic operations and interpret results in terms of the situation • order, represent, add and subtract fractions with the same or related denominators • represent common percentages and connect	By the end of year 6, students: • use integers to represent points on a number line and in the Cartesian plane • operate with decimals and connect decimal representations to the metric system • solve problems using the properties of prime, composite and square numbers • use mathematical modelling to solve financial and other practical problems involving percentages and rational numbers, formulate and solve the problem, and justify choices • order common fractions, giving reasons, and add and subtract fractions with related denominators • use all 4 operations with decimals and connect decimal representations of measurements to the metric system • solve problems involving finding a fraction, decimal or percentage of a quantity

				fraction and decimal notations • count and represent fractions on a number line.	them to their fraction and decimal equivalents.	and use estimation to find approximate solutions to problems involving rational numbers and percentages.

Scope and sequence

Strand: Number

Sub-organiser: Place value

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Name, **represent** and **order** numbers including zero to at least 20, **using** physical and virtual materials and numerals: • **recognise** the order in the sequence of numbers to 20 and identify the number that is 'one less' and 'one more' • **read** a numeral and **collect** the associated quantity to match the number required • **write** a numeral on a container as a label to show how many objects it contains • **identify** and **write** numerals to 20.	**Recognise, represent** and **order** numbers to at least 120 **using** physical and virtual materials, numerals, number lines and charts: • **use** materials, such as a number track, number line, and 0 to 120 chart, to **order** and **position** numbers • **recognise, sort** and order a collection of Australian coins and, or notes according to their denomination • **recognise** that numbers are used in all languages and cultures but may be represented differently in words and symbols; for example, through kanji numbers in Japanese and characters in Chinese, and that there are alternate numeration systems.	**Recognise, represent** and **order** numbers to at least 1000 **using** physical and virtual materials, numerals and number lines: • **read** and **write** two-, three-, and four-digit numbers **using** patterns in the number system • **group** large quantities of materials into hundreds, tens, and ones to represent two- and three-digit numbers • **recognise** missing numbers on different number lines; for example, a number line with 1800 on one end and 220 on the other, with every decade numbered.	**Recognise, represent** and **order** natural numbers **using** naming and writing conventions for numerals beyond 10 000: • **move** materials from one place to another on a place value model to **show renaming** of numbers; for example, 1574 can be shown as one thousand, 5 hundreds, 7 tens and 4 ones, or as 15 hundreds, 7 tens and 4 ones • **use** the repeating pattern of place value and sets of three digits to **name** and **write** numbers up to the millions and beyond • **compare**, **read** and **write** the numbers involved in the more than 60 000 years of First Peoples of Australia's presence on the Australian continent through time scales relating to pre-colonisation and post-colonisation.	**Recognise** and **extend** the application of place value to tenths and hundredths and **use** the conventions of decimal notation to **name** and **represent** decimals: • **use** diagrams and materials, such as the bar model and 'decipipes', to divide a whole into 10 equal pieces to **represent** one-tenth and **understand** that one-tenth of one-tenth is equal to one-hundredth of a whole.	**Interpret, compare** and **order** numbers with more than 2 decimal places, including numbers greater than one, **using** place value understanding; **represent** these on a number line: • **understand** that as each place value extends to the right of the decimal place, the value of the place decreases by a factor of 10 • **name** decimals by their place value to assist with understanding and calculation. For example, 'Two tenths add three hundredths is equal to twenty-three hundredths, as one tenth is equal to ten hundredths' • **use** number lines to **justify** the magnitude of decimals and to **solve** worded problems involving addition and subtraction of decimals.	**Recognise** situations, including financial contexts, that use integers; **locate** and **represent** integers on a number line and as coordinates on the Cartesian plane: • **understand** that numbers that extend to the left of 0 on a number line are decreasing and are negative, and those extending from the right of 0 are increasing and are positive • **recognise** the relationship between two numbers on either side of 0 in terms of their distance from 0 using a number line and **calculate** the difference between integers. For example, there is a difference of 11 between 6 and -5, as 6 is 6 ones from 0 and -5 is 5 ones from 0, giving a sum of 11 • **use** number lines from many starting points. For example, plotting integers on a number line from -150 to -100.

Strand: Number

Sub-organiser: Place value

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Partition and **combine** collections up to 10 using part-part-whole relationships and subitising to recognise and name the parts: • **partition** collections of up to 10 objects in different ways and identifying the part-part-whole relationship; for example, partitioning a collection of 6 counters into 4 counters and 2 counters and saying, 4 is a part, 2 is a part and 6 is the whole • **recognise** numbers represented in tens frames, and describe their reasoning: 'I saw 5 counters in the first column and 2 counters in the next and that makes 7'.	**Partition** one- and two-digit numbers in different ways using physical and virtual materials, including partitioning two-digit numbers into tens and ones: • build knowledge and understanding of the part-part-whole facts to 10, using physical and virtual materials • **use** physical and virtual materials to **partition** numbers into counts of tens and ones; for example, recognise 35 as 3 tens and 5 ones or as 2 tens and 15 ones • **use** part-part-whole reasoning and materials to **represent** 24, then partitioning 24 in different ways; for example, 10, 10,10 and 4 combine to make 24 or 10 and 14 combine to make 24.	**Partition, rearrange, regroup** and **rename** two-and three-digit numbers **using** standard and non-standard groupings; recognise the role of a zero digit in place value notation: • **partition** numbers in a variety of ways including into hundreds, tens and ones • **partition** and **rename** numbers flexibly in different ways using knowledge of place value. For example, renaming 245 as 24 tens and 5 ones, or 2 hundreds and 45 ones • **compare** the digits of a number with materials grouped into hundreds, tens, and ones and **explain** the meaning of each of the digits in relation to the materials.				

Strand: Number

Sub-organiser: Calculation strategies

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Recognise and **name** the number of objects within a collection up to 5 using subitising: • **recognise** how many objects are in a collection or images are on a card with a quick look and saying the associated number without counting • **use** subitising to compare and order collections and to say who has more or less • **use** part-part-whole knowledge to see smaller collections within larger collections; for example, I can see 2 dots and 3 dots which I know is 5.	**Add** and **subtract** numbers within 20, using physical and virtual materials, part-part-whole knowledge to 10 and a variety of calculation strategies: • **use** physical and virtual materials, pictorial representations and number combinations within 10 to add and subtract collections to 20 • **add** and **subtract** numbers within 20, using a variety of strategies such as counting on, counting back, partitioning and part-part-whole knowledge of numbers to 10 • **represent** story problems involving addition and subtraction of numbers within 20 using a Think Board, recognising and using + and – symbols and the equal sign to represent the operations of addition and subtraction • **create** and **perform** addition and subtraction stories told through First Nations Australians' dances.	**Add** and **subtract** one- and two-digit numbers, **represent** problems using number sentences, and **solve** using part-part-whole reasoning and a variety of calculation strategies: • **use** the associative property of addition to assist with mental calculation to **partition**, **rearrange** and **regroup** numbers using number knowledge, near doubles and bridging to 10 strategies • **use** the commutative property of addition ($a + b = b + a$) to assist with mental calculation • **represent** addition and subtraction problems using a bar model and writing a number sentence, explaining how each number in the sentence is connected to the situation • **use** mental strategies and informal written jottings to help keep track of the numbers when solving addition and subtraction problems involving two-digit numbers.	**Add** and **subtract** two-digit and three-digit numbers using place value to **partition, rearrange** and **regroup** numbers to assist in calculations without a calculator: • **determine** when a vertical algorithm is the most efficient method of addition or subtraction • **solving** problems efficiently by adding or subtracting a constant amount to both numbers to create an easier calculation. For example, $534 - 395$, adding 5 to both sides to make $539 - 400 = 139$, understanding that this is the same solution to the original problem.			**Apply** knowledge of place value to **add** and **subtract** decimals, using digital tools where appropriate; use estimation and rounding to **check** the reasonableness of answers: • **use** estimation to **approximate** the addition and subtraction of numbers with decimals before calculating to **determine** the reasonableness of an answer, to at least the thousandths • **use** knowledge of whole-number strategies, for example, basic facts, place value and inverse relationships to **apply** mental strategies for addition and subtraction of decimal numbers to at least hundredths • **convert** measurements into smaller or larger units to assist with addition and subtraction. For example, to find the combined weight of two items weighing 1.708kg and 1.77kg, converting to grams and adding 1708g and 1770g.

Strand: Number

Sub-organiser: Calculation strategies

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Quantify and **compare** collections to at least 20 **using** counting and **explain** or **demonstrate** reasoning: • **use** counting songs, story books and rhymes to establish the forwards and backwards counting sequence of numbers • **use** counting to **compare** the size of two or more collections of like items to justify which collection contains more or less items • **establish** the language and process of counting, **develop** the principles of counting: ○ recite the names of numbers in the correct sequence (number sequence) ○ say the number names in a one-to one correspondence with the object (one-to-one correspondence) ○ understand that each object must be counted only once ○ understand that the last number counted answers the question of 'How many?' (cardinality) ○ know that the number does not change if objects are rearranged unless objects are added or taken away (conservation of number).	**Quantify** sets of objects, to at least 120, by **partitioning** collections into equal groups using number knowledge and skip counting: • **count** a large collection of items using groups of fives or tens and skip counting to work out how many there are • **count** collections of objects by grouping them in tens to enable efficient counting and connecting the digits in the number to the groups of tens and ones • **count** collections of Australian $1 coins by grouping into piles of 10, then skip counting and counting any left-over coins to determine the total amount.		**Recognise** the relationships between dollars and cents and **represent** money values in different ways: • **investigate** the relationship between dollars and cents, **using** physical or virtual materials to make different combinations of the same amount of money. For example, knowing that $1 is equal to 100 cents; representing $1.85 as $1 + 50c + 20c + 10c + 5c, or 50c + 50c + 50c + 10c + 10c + 10c + 5c • **calculate** change required for simple calculations to the nearest 5c during simple role-playing scenarios. For example, when calculating change for buying an item for $1.30 from $2, starting from $1.30, then adding 20c and 50c to count up to $2 • **solve** problems involving the addition and subtraction of money, **understanding** that digital transactions do not involve the calculation of change.			

Strand: Number

Sub-organiser: Calculation strategies

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Multiply and **divide** by one-digit numbers using repeated addition, equal grouping, arrays, and partitioning to support a variety of calculation strategies: • **make** and **name** arrays and using bar models to **solve** simple multiplication or sharing problems; for example, make different arrays to **represent** 12 and name them as '3 fours', '2 sixes', '4 threes', '6 twos' • **find** the total number represented in an array by **partitioning** the array and **using** subitising and number facts • **recognise** problems that can be solved using division and **identify** the difference between dividing a set of objects into 3 equal groups (partition) and dividing the same set of objects into groups of 3 (quotation) • **use** a Think Board to **solve** partition and quotation division problems; for example, sharing a prize of $36 between 4 people, using materials, a diagram and skip counting to find the answer; explaining whether the answer 9 refers to people or dollars.	**Multiply** and **divide** one- and two-digit numbers using number sentences, diagrams and arrays, and using a range of calculation strategies: • **apply** knowledge of numbers and the properties of operations to represent multiplication and division sentences, for example, with an array, diagrams and worded problems • **use** part-whole models to **solve** multiplication problems with two digits. For example, when solving 14×5, recognising that 14 is 10 + 4 and calculating $10 \times 5 = 50$, $4 \times 5 = 20$, and $50 + 20 = 70$ • **recognise** that multiplication and division are inverse operations and **use** this understanding to solve division problems. For example, when solving $45 \div 5$, recognising that 5×9 is 45, and so $45 \div 5 = 9$.	**Solve** problems involving multiplying or dividing natural numbers by multiples and powers of 10 without a calculator, through **use** of the multiplicative relationship between the place value of digits: • **understand** that each place value to the left increases in value by a factor of 10, and each place value to the right decreases in value by a factor of 10 • **use** calculators or computational tools to **recognise** the effect of multiplying numbers by 10s, 100s and 1000s and **explain** the patterns noticed. **Develop** efficient strategies and use appropriate digital tools for solving problems involving addition and subtraction, and multiplication and division where there is no remainder: • **choose** and **use** efficient strategies for problems involving larger numbers. For example, applying the distributive law to solve 5×18, by recognising that 5×18 is equal to $5 \times 10 + 5 \times 8$, and using known multiplication facts to solve	**Solve** problems involving multiplication of large numbers by one- or two-digit numbers, **choose** efficient calculation strategies and **use** digital tools where appropriate; **check** the reasonableness of answers: • **choosing** and **applying** efficient strategies to **calculate** multiplication problems, including the area model, Italian lattice model and vertical algorithm, to **demonstrate** an understanding of place value. • **use** estimation to **determine** the reasonableness of an answer. For example, when solving 47×8, knowing that the product should be less than 470, by mentally rounding and calculating 47×10. **Solve** problems involving division, **choose** efficient strategies and **use** digital tools where appropriate; **interpret** any remainder according to the context and express results as a whole number, decimal or fraction: • **determine** when to round up or down in worded division problems. For example, when calculating	**Multiply** and **divide** decimals by multiples of powers of 10 without a calculator, apply knowledge of place value and multiplication facts, and **use estimation** and **rounding** to **check** the reasonableness of answers: • **apply** place value knowledge, understanding that the value of the digit is 10 times smaller each place to the right, and 10 times larger to the left • **explain** the effect of multiplying and dividing a decimal by 10, 100, 1000, and so on in terms of place value, and not the decimal shifting. For example: '$1.5 \times 10 = 15$, as 10 groups of 1 is 10 and 10 groups of 0.5 is 5, which totals 15'.

				• **recognise** when to use a vertical algorithm as the most efficient calculation method.	how many buses are required for 436 people, where each bus carries 50 people, an answer of 8 and $\frac{36}{50}$, requires rounding up to 9 buses • **apply** fluency of multiplication facts and their related division facts, and the fact that equivalent division calculations result if both numbers are divided by the same factor. For example, $120 \div 8$, can be solved by dividing each number by 4 to change the equation to $30 \div 2 = 15$.	

Strand: Number

Sub-organiser: Estimation strategies

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Estimate the quantity of objects in collections and make estimates when solving problems to **determine** the reasonableness of calculations: • **choose** which place value to use when estimating for different situations. For example, estimating to the nearest 10 when estimating the number of dots on a ladybird, and estimating to the nearest 1000 when estimating crowd sizes at an event • **check** the reasonableness of addition calculations by using two- and three-digit numbers to the nearest ten or hundred. For example, using $200 + 400$ to estimate and check a calculation of $219 + 385$.	**Choose** and **use** estimation and rounding to **check** and **explain** the reasonableness of calculations including the results of financial transactions: • **understand** when it is appropriate to round up or down to the nearest 5 or 10. For example, understanding the impacts of rounding the price of every item down, when calculating a budget for a shopping trip • **apply** estimation strategies to determine if a solution is a reasonable response to a calculation or not.	**Check** and **explain** the reasonableness of solutions to problems including financial contexts through **use** of estimation strategies appropriate to the context: • **understand** when to use estimation for a problem, and when approximate calculation is appropriate • **investigate** scenarios when rounding is used and when exact amounts are used, for example, paying $10.02 in cash, where the amount is rounded down to $10.00, compared to making a digital transaction, where the amount is not rounded.	**Approximate** numerical solutions to problems involving rational numbers and percentages, including financial contexts, through **use** of appropriate estimation strategies: • **use** familiar fractions, decimals and percentages, such as 10%, 25% and 50% to approximate calculations. For example, when finding 15% of 180, knowing that 10% is 18, so 5% must be 9, which means 15% of 180 is 27 • **apply** knowledge of familiar fractions to estimate solutions to problems. For example, knowing that 53% of 1200 must be at least 600.

Strand: Number

Sub-organiser: Number properties

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Explain and **use** the properties of odd and even numbers: • **understand** the conditions required for a number to be odd or even, such as an even amount of materials can be shared equally between two people, and that odd and even only applies to whole numbers • **explain** why all numbers ending in the digits 0, 2, 4, 6 and 8 are even and those ending in 1, 3, 5, 7 and 9 are odd • **explain** the patterns noticed when adding, subtracting, and multiplying by even and odd numbers. For example, odd + odd, always amounts to an even number, as does even + even.	**Express** natural numbers as products of their factors, recognise multiples and **determine** if one number is divisible by another: • **use** materials, such as counters or blocks to systematically **determine** the factor pairs of a number. For example, 36 can be broken into 1 group of 36, 2 groups of 18, 3 groups of 13, 4 groups of 9, and 6 groups of 6, giving it 9 factors • **apply** divisibility tests, such as adding the digits of a number and calculating if they are divisible by 3 to **determine** if the original number is divisible by 3. For example, 321 is divisible by 3, as $3 + 2 + 1$ is equal to 6, which is divisible by 3. Extending this rule to determine that a number is divisible by 6 when it is divisible by 2 and 3, as these are factors of 6.	**Identify** and **describe** the properties of prime, composite, and square numbers and use these properties to **solve** problems and **simplify** calculations: • **understand** that a prime number has 2 distinct factors of one and itself and therefore 1 is not a prime number • **use** division tests and factor trees to **represent** composite numbers as a product of their prime factors. For example, 16 can be broken into 4×4, then two sets of 2×2, meaning its prime factorization is $2 \times 2 \times 2 \times 2$, or 2^4 • **identify** and **describe** the product of a number with itself as square; for example, 3 x 3 is the same as 3^2, and that numbers can be proved as being square if they can be made into a square array. For example, 10 is not a square number, as the only arrays that can be made with 10 are 2×5, 5×2, 10×1, and 1×10.

Strand: Number

Sub-organiser: Mathematical modelling

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Represent practical situations involving addition, subtraction and quantification with physical and virtual materials and **use** counting or subitising strategies: • **use** role-play and materials to **represent** mathematical relationships in stories; for example, 'Eight kangaroos were drinking at the river and 3 hopped away'; drawing a picture and using materials to represent the situation, discussing, and recording the result of the action with a numeral • **role play** or actively engage in situations that involve quantifying or comparing collections of items or simple money transactions • **represent** addition and subtraction situations found in leaf games involving sets of objects used to tell stories, such as games from the Warlpiri Peoples of Yuendumu in the Northern Territory.explaining,subtraction,	**Use** mathematical modelling to **solve** practical problems involving additive situations including simple money transactions; **represent** the situations with diagrams, physical and virtual materials, and **use** calculation strategies to **solve** the problem: • **model** problems involving addition and subtraction presented in stories, using a Think Board to represent the problem, solving the problem using physical materials and explaining the connections between any materials used, the diagram and the numbers within the story • **model** simple money problems involving addition and subtraction using whole dollar amounts.					

Represent practical situations that involve *equal sharing* and *grouping* with physical and virtual materials and use counting or subitising strategies: • **use** materials to role-play equal sharing; for example, sharing pieces of fruit or a bunch of grapes between 4 people and discussing how you would know they have been shared equally • **understand** that equal groups means the same amount in each group • **explore** instructive games of First Nations Australians that involve sharing; for example, playing Yangamini of the Tiwi Peoples of Bathurst Island to investigate and discuss equal sharing.	**Use** mathematical modelling to **solve** practical problems involving *equal sharing* and *grouping*; represent the situations with diagrams, physical and virtual materials, and use calculation strategies to solve the problem: • **model** problems involving repeated equal group situations, such as, 'How many wheels are needed for 3 cars?', using materials and drawing pictorial representations to show what they did, and recording the results with a number • **model** money problems involving equal sharing; for example, sorting coins from a money box according to their denominations, sharing the coins equally between 4 people, and using counting or subitising to ensure they have equal amounts of each denomination.	**Use** mathematical modelling to **solve** practical problems involving *additive* and *multiplicative* situations, including money transactions; **represent** situations and choose calculation strategies; interpret and communicate solutions in terms of the situation: • **model** practical problems to **interpret** an everyday additive or multiplicative situation; for example, making a number of purchases at a store and **decide** whether to use addition or subtraction, multiplication, or division to **solve** the problem and **justify** the choice of operation • **model** and **solve** simple money problems involving whole dollar amounts with addition, subtraction, multiplication, or division.	**Use** mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts; **formulate** problems using number sentences and **choose** calculation strategies, using digital tools where appropriate; **interpret** and **communicate** solutions in terms of the situation: • **use** materials and number sentences to **represent** a problem. For example, if working out '48 horses need to be evenly split into 6 paddocks, how many horses will be in each paddock?' writing this with the number sentence 48 ÷ 6 = □ and using materials to model the whole, the parts and to find the unknown • **use** diagrams, including the bar model, to represent an additive or multiplicative situation with the parts and whole.	**Use** mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts; **formulate** the problems using number sentences and **choose** efficient calculation strategies, using digital tools where appropriate; **interpret** and **communicate** solutions in terms of the situation: • **use** materials and diagrams, such as the bar model and arrays, to represent a number sentence, **explain** how each number or unknown is connected to the number sentence, either as a part, whole, or unknown part or whole • **interpret** worded problems and situations, including those involving money, and **model** how to solve the problem using number sentences. For example, 'Amara read 16 books for the readathon. Maryam read 4 times as many books. How many books did Maryam read?' which can be represented and solved with the number sentence 16×4.	**Use** mathematical modelling to solve practical problems involving additive and multiplicative situations including financial contexts involving natural numbers; **formulate** the problems, **choose** operations and efficient calculation strategies, **use** digital tools where appropriate; **interpret** and **communicate** solutions in terms of the situation: • **determine** when to use mental calculation strategies or digital tools to solve a problem • **explain** which operation(s) is required to solve a worded problem and why. For example, if solving the worded problem, 'If there are 18 packets of lollies and 42 lollies in each, how many lollies do I have in total?' recognising that this is a multiplicative problem as it includes multiple groups of the same size.	**Use** mathematical modelling to solve practical problems , involving rational numbers and percentages; **formulate** the problems, **choose** operations and efficient calculation strategies, and **use** digital tools where appropriate; **interpret** and **communicate** solutions in terms of the situation, **justify** the choices made: • **model** a situation by identifying the problem and **formulate** a mathematical expression, using brackets where necessary, to find a solution, then explain how and why the expression represents the situation. For example, 'An ice-cream store sells plain ice-creams for $3 each, and flakes for 50c each. What is the cost of 6 ice-creams with flakes?' This could be represented with the equation: cost = $(\$3 + \$0.5) \times 6$ $= \$21$ • **model** situations involving earning money and budgeting and asking questions such as 'Can I afford it?' 'Do I need it?' 'How much do I need to save for it?' followed by the creation of a budget or savings plan.

Strand: Number

Sub-organiser: Fractions, decimals, and percentages

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Recognise and **describe** one-half as one of 2 equal parts of a whole and connect halves, quarters, and eighths through repeated halving: • **create** halves of a range of collections by sharing collections sets into 2 equal groups • **create** halves using measurement attributes; for example, explaining that 'one half is one part out of 2 equal parts of a whole'; equally folding a strip of paper, then selecting one of the parts and naming it 'one-half' • **use** repeated halving to subdivide shapes and objects in different ways to make corresponding halves, quarters, and eighths; naming the parts and compare the size of them to notice that they are all the same size, and demonstrate that a quarter is a half of a half and that an eighth is a half of a quarter • **divide** a shape into equal parts and relate the number of parts to the unit fraction; for example, if there are 4 equal parts then each part is a one-quarter and if there are 8 equal parts then each is one-eighth.	**Recognise** and **represent** unit fractions including $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{10}$ and their multiples in different ways; **combine** fractions with the same denominator to complete the whole: • **recognise** that unit fractions represent one part of a whole which has been divided into equal parts • **represent** unit fractions and their multiples in different ways, including diagrams, concrete materials, a situation, and fraction notation, connecting the parts and the whole to division.	**Find** equivalent representations of fractions using related denominators and **make connections** between fractions and decimal notation: • **identify** and **represent** fraction families with like denominators, such as $\frac{1}{4}$, $\frac{2}{8}$, $\frac{4}{16}$, with materials such as paper strips, cups, and so on to show that the size of the fraction remains the same • **connect** equivalent fractions and decimals on a number line, such as 0.25m on a metre ruler being equivalent to $\frac{1}{4}$ of a metre.	**Compare** and **order** fractions with the same and related denominators including mixed numerals, **apply knowledge** of factors and multiples; **represent** these fractions on a number line: • **use** materials to represent equivalent fractions, such as pattern blocks, fractions walls and number lines that extend beyond 1 • **understand** that a fraction wall represents the area of a fraction, whereas a number line identifies the distance of a fraction from zero, or a designated point • **convert** between mixed numerals and improper fractions and **identify** equivalences on a number line.	**Apply** knowledge of equivalence to **compare, order** and **represent** common fractions including halves, thirds and quarters on the same number line and **justify** their order: • **apply** knowledge of factors and multiples to **compare, order** and **represent** fractions with like denominators on a number line. For example, halves with quarters, eighths, twelfths and sixteenths, and thirds with sixths, ninths, and twelfths • **justify** positions of fractions of a number line through an understanding of the relationship between the numerator and denominator and size of a fraction. For example, explaining that $\frac{5}{8}$ is greater than $\frac{1}{2}$, as one half of 8 is 4, so $\frac{5}{8}$ must be positioned on the right of $\frac{1}{2}$ on a number line • **identify** and **justify** equivalent fractions with models of fractions, such as the bar model to show that $\frac{6}{8}$ is equivalent to $\frac{9}{12}$.

Strand: Number

Sub-organiser: Fractions, decimals, and percentages

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Count by fractions including mixed numerals; **locate** and **represent** these fractions as numbers on number lines: • **understand** that fractions can be larger than one whole and can be represented with an improper fraction and mixed numeral • **convert** between mixed numerals and improper fractions by connecting multiplication and division. For example, when converting $\frac{14}{5}$ to a mixed numeral, recognising that 14 makes two lots of 5 and 4 remaining, represented as 2 and $\frac{4}{5}$.	**Solve** problems involving **addition** and **subtraction** of fractions with the same denominator, **use** different strategies: • **understand** that when adding or subtracting fractions with the same denominator, such as $\frac{1}{8}+\frac{3}{8}$, that the numerator will change, but the denominator remains the same as it indicates the size of the fractional parts. The fraction may then be simplified by finding equivalences.	**Solve** problems involving **addition** and **subtraction** of fractions **using** knowledge of equivalent fractions: • **use** properties of equivalence to efficiently solve problems, determining the lowest common denominator through an understanding of prime and composite numbers. For example, in the expression $\frac{2}{3}+\frac{3}{12}$, identifying that 3 is a factor of 12, therefore $\frac{2}{3}$ can be replaced with an equivalent fraction to simplify the calculation to $\frac{8}{12}+\frac{3}{12}=\frac{11}{12}$ • **use** arrays and fraction overlays to represent the fractions being added or subtracted.

Strand: Number

Sub-organiser: Fractions, decimals, and percentages

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					Recognise that 100% represents the complete whole and **use** percentages to **describe, represent** and **compare** relative size; **connect** familiar percentages to their decimal and fraction equivalents: • **recognise** applications of percentages in everyday contexts. For example, a bar model in device power percentages and advertising in retail contexts relating to discounts • **use** models, such as 10 x 10 grids to represent various percentages and connect them to their fraction and decimal equivalents • **apply** an understanding of 100% being the whole, to models with less than or more than 100 parts. For example, a 10 x 5 grid, recognising that half is 25 squares, which is 50%, so each square in the grid represents 2% of the whole.	**Solve** problems that require finding a familiar fraction, decimal or percentage of a quantity, including percentage discounts, **choose** efficient calculation strategies and **use** digital tools where appropriate: • **link** percentages to their decimal equivalent and use digital tools to calculate percentage discounts. For example, when finding 30% off a product priced at $85, multiplying $85 by 0.3, then subtracting this value from $85, or recognising that if a product has a discount of 30%, then it is 70% of the original value being paid and calculating $85 x 0.7 • **use** multiplication and division to find a fraction, decimal or percentage of a quantity, amount, measurement, and so on when the total value is unknown. For example, in a problem where it is known that 20% of the total value is $8, multiplying $8 by 5 to find the total, or when finding $\frac{3}{8}$ of 50, dividing 50 by 8, to find one eighth, then multiplying by 3 to find three-eighths.

Achievement standards

Strand: Algebra

The *Algebra* strand develops ways of using symbols and symbolic representations to think and reason about relationships in both mathematical and real-world contexts. It provides a means for manipulating mathematical objects, recognising patterns and structures, making connections, understanding properties of operations and the concept of equivalence, abstracting information, working with variables, solving equations, and generalising number and operation facts and relationships. Algebra connects symbolic, graphic, and numeric representations. It deals with situations of generality, communicating abstract ideas applied in areas such as science, health, finance, sports, engineering, and building and construction. equations,graphic,

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
By the end of reception, students: • copy and continue repeating patterns.	By the end of year 1, students: • use numbers, symbols, and objects to create skip counting and repeating patterns, identifying the repeating unit.	By the end of year 2, students: • describe and continue patterns that increase and decrease additively by a fixed amount • identify missing elements in patterns.	By the end of year 3, students: • recall multiplication facts for twos, threes, fours, fives, and tens, using a range of strategies • find unknown values in number sentences involving addition and subtraction • create algorithms to investigate numbers and explore simple patterns.	By the end of year 4, students: • Find unknown values in numerical equations involving addition and subtraction • follow and create algorithms that generate sets of numbers and identify emerging patterns.	By the end of year 5, students: • create and use algorithms to identify and explain patterns in the factors and multiples of numbers • apply properties of numbers and operations to find unknown values in numerical equations involving multiplication and division.	By the end of year 6, students: • identify and explain rules used to create growing patterns • create and use algorithms to generate sets of numbers, using a rule • find unknown values in numerical equations involving combinations of arithmetic operations.

Scope and sequence

Strand: Algebra

Sub-organiser: Repeating patterns

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Recognise, **copy,** and **continue** repeating patterns represented in different ways: • **use** materials, shapes, sounds, movements, or drawings to copy and continue repeating patterns, **identify** the unit of repeat and number of elements within a unit of repeat • **recognise**, **copy** and **continue** repeating patterns represented in different ways • **use** materials, shapes, sounds, movements, or drawings to **copy** and **continue** repeating patterns, **identifying** the unit of repeat • **recognise** and **describe** repeating patterns that can be observed on Country or Place and in First Nation Australians artwork.	**Recognise, continue** and **create** repeating patterns with numbers, symbols, shapes, and objects, identifying the repeating unit: • **interpret** a repeating pattern, **identify** the unit of repeat, and **continue** the pattern or **identify** a missing element • **generalise** a repeating pattern by **identifying** the unit of repeat and **represent** the elements using numbers • **consider** how the making of shell or seed necklaces by First Nations Australians' includes practices such as sorting shells and beads based on colour, size, and shape, and creating a repeating pattern sequence.	**Recognise, describe,** and **create** additive patterns that increase or decrease by a constant amount, using numbers, shapes, and objects, and identify missing elements in the pattern: • **create** a repeated pattern with materials, **write** the associated number sequence • **recognise** patterns in the built environment to locate repeated pattern sequences; for example, 'How many windows in one train carriage, 2 train carriages, 3 train carriages …?' or 'How many wheels on one car, 2 cars, 3 cars…?' and recording the results in a diagram or table • **recognise** the constant amount being added or subtracted in a repeating pattern and using it to identify missing elements in the sequence.				

Strand: Algebra

Sub-organiser: Number patterns

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Recognise, continue and **create** pattern sequences, with numbers, symbols, shapes, and objects, formed by skip counting, initially by twos, fives, and tens: • **use** materials, such as blocks or beads, to **represent** number sequences when skip counting • **recognise** patterns formed from skip counting, for example, skip counting by 5s, from 0, always ends in a 5 or 0.	**Recall** and **demonstrate proficiency** with addition facts to 20; extend and apply facts to develop related subtraction facts: • **use** materials such ten-frames, bead strings, connecting cubes or rekenreks to **develop** and **record** addition and subtraction strategies and **explain** patterns and connections noticed within the facts • **partition** collections to practice and develop fluency with addition and subtraction facts to 20 leading to the recall of these facts.	**Extend** and **apply** knowledge of addition and subtraction facts to 20 to develop efficient mental strategies for computation with larger numbers without a calculator: • **use** materials, such as ten frames or Unifix cubes, in a systematic way, to record addition and subtraction strategies, including doubles, near doubles, counting on, combinations to and bridging to 10 and **explain** patterns noticed • **extend** addition facts up to 20 to related facts with different place value, for example, $6 + 6 = 12$, so $60 + 60 = 120$ and $600 + 600 = 1200$.			
		Recall and **demonstrate proficiency** with multiplication facts for twos; extend and **apply** facts to develop the related division facts using doubling and halving: • **recognise** and **relate** terms such as double, twice, and multiply by 2, halve and divide by 2 using physical and virtual materials • **double** and **halve** collections to practise and develop fluency with	**Recall** and **demonstrate** proficiency with multiplication facts to 3, 4, 5 and 10; **extend** and **apply** facts to develop the related division facts: • **use** concrete materials to **represent** multiplication facts and use the language of '3 groups of 2 equals to 6', to develop '3 twos are 6', then establishing the number sentence '$3 \times 2 = 6$'.	**Recall** and **demonstrate** proficiency with multiplication facts up to 10 x 10 and related division facts; **extend** and **apply** facts to **develop** efficient mental strategies for computation with larger numbers without a calculator: • **use** known multiplication facts of 2s, 3s, 4s, 5s and 10s to **develop** multiplication facts for 6s, 7s, 8s and 9s. For example, recognising that as $3 \times 6 =$	**Recognise** and **explain** the connection between multiplication and division as inverse operations and **use** this to **develop** families of number facts: • **use** materials and/or diagrams to **represent** multiplication and division facts. For example, using 24 counters to determine and record 2 multiplication and 2 division facts for each grouping: $4 \times 6 = 24$, $6 \times 4 = 24$, $24 \div 6 = 4$ and	**Recognise** and **use** rules that generate visually growing patterns and number patterns involving rational numbers: • **recognise** when a pattern is increasing by a constant amount or if each successive term is increasing or decreasing. For example, in the sequence 3, 6, 9, 12, and so on, each term grows by a constant amount, making it a linear pattern, however, in the sequence

		multiplication and division facts for twos leading to recall of these facts.	• **use** a hundred chart to **recognise** patterns among 2s, 3s, 5s and 10s multiplication facts. For example, 10 facts will always end in a 0, whereas 5s facts will end in a 5 or 0.	18, therefore 6 x 6 must equal 36, as one of the factors has doubled, so too must the product • **apply** understanding of known multiplication facts to **determine** related division facts and fact families. For example, when recalling $4 \times 6 = 24$, establish that $24 \div 6 = 4$ and $24 \div 4 = 6$.	24 ÷ 4 = 6, demonstrating the applicable grouping for each equation • **apply** knowledge of the connection between multiplication and division to **solve** equations with unknown values. For example, solving 240 ÷ 20 = ☐, by thinking 20 x ☐ = 240.	1, 4, 9, 16, 25 and so on, the amount by which each term increases is growing • **create** pattern sequences with materials or diagrams, recording the associated number sequence in an input/output table, and **describe** the pattern with a rule that can be replicated. For example, using matchsticks to create a pattern of triangles using 3 matchsticks for 1 triangle in the first term, 5 matchsticks for 2 connected triangles in the second term, 7 matchsticks for 3 triangles in the third term, and so on. Explaining that to find the number of matchsticks in the *n*th term, you multiply the term by 2, then add 1 for the extra matchstick in the first triangle.

Strand: Algebra

Sub-organiser: Algorithms

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Follow and **create** algorithms involving a sequence of steps and decisions to **investigate** numbers; **describe** any emerging patterns: • **follow** and **create** a simple or repeated series of steps to perform a mathematical calculation. For example, using repeated addition to establish the multiplication facts for 2s, 3s, 5s and 10s • **create** an algorithm as a set of instructions for a classmate to follow to generate multiples of three. For example, 'To multiply by 3, you double the number and add on one more of the number you are multiplying by'; $6 \times 3 = 6 \times 2 + 6$.	**Follow** and **create** algorithms involving a sequence of steps and decisions that use addition or multiplication to **generate** sets of numbers; **identify** and **describe** any emerging patterns: • **follow** and **create** a simple or repeated series of steps to perform a mathematical calculation. For example, creating an algorithm for someone to follow to establish multiplication facts for 9s, such as, 'To find 8 x 9, first calculate 8 x 10, then subtract 8' • **use** digital tools, such as a spreadsheet, to apply formulas to multiple pieces of data through the 'fill down' function to **generate** a sequence of numbers and **describe** emerging patterns.	**Create** and **use** algorithms involving a sequence of steps and decisions and digital tools to **experiment** with factors, multiples, and divisibility; **identify, interpret,** and **describe** emerging patterns: • **create** flow charts that determine whether numbers are factors or multiples of other numbers using decision questions, such as yes/no. For example, when determining if a number is a multiple of 6, first asking the question, 'Is the number even?' if yes, then asking, 'Do the digits add to a multiple of 3?' • **identify** the lowest common multiple and highest common factors. For example, the lowest common multiple of 6 and 9 is 18, and the highest common factor is 3.	**Create** and **use** algorithms involving a sequence of steps and decisions that use rules to **generate** sets of numbers; **identify, interpret,** and **explain** emerging patterns: • **explore** the concept of a function machine to represent inputs and outputs, **determine** the algorithm that has been applied to the input to achieve the output. For example, if the input is 3 and gives an output of 9, the algorithm may be 'multiply by 3', 'add 6', or 'square the number', in which case, more numbers will need the algorithm applied to determine the relationship between the input and output • **compare** additive and multiplicative relationships, showing how quickly the sequences grow in comparison to one another.

Strand: Algebra

Sub-organiser: Numerical equations

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Recognise and **explain** the connection between addition and subtraction as inverse operations, **apply** to **partition** numbers and **find** unknown values in number sentences: • **partition** numbers using materials, part-part-whole diagrams, or bar models to **determine** and record the addition and subtraction facts for each representation and its connection to the materials. For example, when representing $16 + 8 = 24$, also recognising that $24 - 8 = 16$, $24 - 16 = 6$, and $8 + 16 = 24$ • **use** the inverse relationship between addition and subtraction to **find** unknown values with and without a calculator. For example, $27 + \square = 63$, so $\square = 63 - 27$, identifying that the '=' sign means 'is equal to' and not 'the answer is'.	**Find** unknown values in numerical equations involving addition and subtraction, using the properties of numbers and operations: • **use** physical and virtual balance scales to **model** and **solve** equations involving addition and subtraction. For example, two towers of 3 and 4 blocks balance the scale when the other side has two towers of 5 and 2 blocks, which can be recorded as $3 + 4 = 5 + 2$ • **demonstrate** the commutative property of addition to show equivalent number sentences, such as $45 + 3 + 21 = 21 + 45 + 3$ and **understand** that this cannot be applied to subtraction.	**Find** unknown values in numerical equations involving multiplication and division **using** the properties of numbers and operations: • **use** relational thinking to find unknown values in numerical equations and **construct** equivalent equations. For example, knowing that $3 \times 5 = 15$ and $30 \div 2 = 15$, therefore the solution to '$3 \times 5 = 30 \div \square$' is 2 • **use** materials and number sentences to **demonstrate** that multiplication is commutative, however, division is not. For example, $8 \times 3 = 3 \times 8$, but $10 \div 5$ does not equal $5 \div 10$ • **use** materials, diagrams, and arrays to **demonstrate** the distributive law as a method to support calculation. For example, $4 \times 13 = 4 \times 10 + 4 \times 3$.	**Find** unknown values in numerical equations involving brackets and combinations of arithmetic operations, **use** the properties of numbers and operations: • **understand** and **apply** the need for an agreed set of rules, referred to as the order of operations, to solve equations with multiple operations • **know** that in the equation $40 \div 2 \times (4 + 6) = \square$, the expression in the brackets is solved first, then the remainder of the equation is solved from left to right as there is no hierarchy between multiplication and division • **find** multiple solutions to unknown values in equations to **create** balanced expressions in a systematic way. For example, find values that substitute the unknown values in this equation to make it true: $6 + 4 \times 8 = 6 \times \Diamond + \square$.

Achievement standards

Strand: Measurement

The *Measurement* strand develops ways of quantifying aspects of the human and physical world. Measures and units are defined and selected to be relevant and appropriate to the context. Measurement is used to answer questions, show results, demonstrate value, justify allocation of resources, evaluate performance, identify opportunities for improvement and manage results. Measurement underpins understanding, comparison and decision-making in many personal, societal, environmental, agricultural, industrial, health and economic contexts.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
By the end of reception, students: • identify the attributes of mass, capacity, length, and duration • use direct comparison strategies to compare objects and events • sequence and connect familiar events to the time of day.	By the end of year 1, students: • compare and order objects and events based on the attributes of length, mass, capacity and duration, communicating reasoning • measure the length of shapes and objects using uniform informal units.	By the end of year 2, students: • use uniform informal units to measure and compare shapes and objects • determine the number of days between events using a calendar • read time on an analog clock to the hour, half hour and quarter hour.	By the end of year 3, students: • use familiar metric units when estimating, comparing, and measuring the attributes of objects and events • identify angles as measures of turn and compare them to right angles • estimate and compare measures of duration using formal units of time.	By the end of year 4, students: • use scaled instruments and appropriate units to measure length, mass, capacity, and temperature • measure and approximate perimeters and areas • compare angles relative to a right-angle using angle names • convert between units of time when solving problems involving duration.	By the end of year 5, students: • choose and use appropriate metric units to measure the attributes of length, mass, and capacity • solve problems involving perimeter and area • estimate, construct, and measure angles in degrees • convert between 12- and 24-hour time.	By the end of year 6, students: • convert between common units of length, mass, and capacity • use the formula for the area of a rectangle and angle properties to solve problems • interpret and use timetables.

Scope and sequence

Strand: Measurement

Sub-organiser: Using units of measurement

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Identify and **compare** attributes of objects and events, including length, capacity, mass, and duration, using direct comparisons, and communicating reasoning: • **use** attribute specific language, such as: tall, long, short, wide, narrow, high, low, full, empty, holds more, holds less, heavy, light, and so on to **describe** and **compare** objects.	**Compare** directly and indirectly and **order** objects and events using attributes of length, mass, capacity and duration, **communicate** mass,comparisons, • **use** comparative language to describe the order: shortest, short, longer, longest • **order** the mass of objects such as rocks, using hefting and balance scales; using comparative language to explain the order: lightest, light, heavier, heaviest, and how they decided on the order • **pour** from one container to another to compare and order the capacity of containers; describing the order of the results in terms of which holds the most or least, and those in between • **investigate** situations where First Nations Australians estimate, compare and communicate measurements.	**Identify** common uses and represent halves, quarters, and eighths in relation to shapes, objects, and events: • **apply** an understanding of fractions to **demonstrate** how items can be divided into halves, quarters and eighths. For example, cup and spoon measures used in recipes, cutting food into halves, quarters, or eighths, or identifying the halfway point between two points.	**Identify** which metric units are used to measure everyday items; **use** measurements of familiar items and known units to make estimates: • **identify** the units of measurement on pantry items and using items with a mass of 1 kilogram or 500 grams, or a capacity of 1 litre or 500 millilitres as a benchmark to estimate the mass or capacity of other items against.	**Interpret** unmarked and partial units when **measuring** and **comparing** attributes of length, mass, capacity, duration, and temperature, using scaled and digital instruments and appropriate units: • **use** scaled instruments to **measure** and **read** the measurement through an understanding of benchmark measures and the meaning of unmarked units. For example, in a measuring jug with labelled markings in increments of 50mL, understanding that halfway between 50mL and 100mL is approximately 75mL.	**Choose** appropriate metric units when measuring the length, mass, and capacity of objects; **use** smaller units or a combination of units to **obtain** a more accurate measure: • **order** metric units with the same attribute, but different units of measurement from smallest to largest. For example, recognising that 40mm is less than 5cm, even though 40 is greater than 5 • **determine** the most appropriate and accurate unit to measure. For example, a jump length could be measured in metres, but a distance between two towns would be best measured in kilometres. • **recognising** that base units, such as the metre and kilogram , are derived for the International System of Units (SI) and are a universal measure.	**Convert** between common metric units of length, mass, and capacity; **choose** and **use** decimal representations of metric measurements relevant to the context of a problem: • **recognise** the significance of the prefixes in units of measurement. For example, 'kilo' meaning 1000, and connecting this to kilogram meaning 1000 grams, kilometre meaning 1000 metres, and so on. • **identify** and **use** the correct operations to **convert** between units of measurement and recognise equivalences, including millimetres, centimetres, metres, kilometres, milligrams, grams, kilograms, tonnes, millilitres, litres, kilolitres and megalitres.

Strand: Measurement

Sub-organiser: Measuring length, mass, and capacity

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Measure the length of shapes and objects using informal units, recognising that units need to be uniform and used end-to-end: • **use** 2 different units; for example, pop sticks and pencils, to measure the length of an object such as a desk, and explaining why the number of units used may be different • **compare** the length of objects such as a desk and a bookshelf by laying multiple copies of a unit to say which is longer, explaining why they should not have gaps or overlaps between the units.	**Measure** and **compare** objects based on length, capacity and mass using appropriate uniform informal units and smaller units for accuracy when necessary: • **choose** suitable informal units to measure the length of a range of objects; **justify** their choice of a longer unit to measure things that are long, such as the width of a room, and a shorter unit to measure shorter things or when more accuracy is needed • **compare** the capacity of several containers using sand and units such as a spoon or cup, to say which container will hold the most and how much more it will hold • **use** balance scales to **compare** the mass of several objects, selecting an appropriate informal unit • **recognise** that the same informal unit needs to be used when measuring.	**Measure** and **compare** objects using familiar metric units of length, mass and capacity, and instruments with labelled markings: • **understand** that measurement instruments include markings that represent a measurement, and that not all instruments have the same markings. For example, a measuring jug may have a marking for every 50mL, whereas a measuring cup may have a marking for every 25mL, requiring the measurement to be estimated when in between markings.	**Recognise** ways to **measure** and **approximate** the perimeter and area of shapes and enclosed spaces, through use of appropriate formal and informal units: • **recognise** that perimeter is a 1-dimensional, linear measurement and is the sum of the length of sides that form the boundary of an enclosed shape • **recognise** that area is a 2-dimensional measurement and is the amount of space covered by a shape • **use** appropriate, uniform units to measure the area covered by a shape or object, including the use of 1cm grid paper to **calculate** the squares covered by regular and irregular shapes • **investigate** the ways First Nations Ranger Groups and other groups measure areas of land to make decisions about fire burns to care for Country/Place.	**Solve** practical problems involving the perimeter and area of shapes through use of appropriate metric units: • **use** physical and virtual materials, such as a geoboard, to investigate the relationship between perimeter and area. For example, finding the largest area possible with a given perimeter • **determine** efficient ways to calculate perimeter of rectangles, such as adding the length and width, then doubling the result • **apply** strategies to **find** the area of compound shapes using 1cm grid paper, such as splitting the shape into rectangles • **explore** the designs of fishing nets and dwellings of First Nations Australians, investigate the perimeter, area and purpose of the shapes within the designs.	**Establish** the formula for the area of a rectangle and **use** it to solve practical problems: • **use** 1cm grid paper to **construct** a variety of rectangles, record the side lengths and area in a table to **establish** the formula for the area of a rectangle through recognition of the relationship between the length of the sides and its area • **investigate** the connection between the perimeters of different rectangles with the same area and between the areas of rectangles with the same perimeter • **determine** the area of compound shapes. For example, finding the area of a pool boundary by finding the total area, then subtracting the area of the pool.

Strand: Measurement

Sub-organiser: Angles

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		Identify, **describe,** and **demonstrate** quarter, half, three-quarter and full measures of turn in everyday situations: • **identify** things that turn in the school environment; for example, the handle on a tap or a door, identifying a half turn and a full turn, drawing a diagram and labelling it with arrows to show the direction and amount of turn • **investigate** hands turning on a clock and **relate** quarter, half and full hours to angles and the language of clockwise or anti-clockwise • **give** or **follow** directions to locate an object in the room, or provide a pathway through a grid, such as programming a robot, referring to quarter, half, three-quarter and full turns.	**Identify** angles as measures of turn and **compare** angles with right angles in everyday situations: • **apply** understanding of quarters and halves to **identify** and **compare** to right angles. For example, a half turn is equal to two right angles.	**Estimate** and **compare** angles using angle names including acute, obtuse, straight angle, reflex, and revolution, and **recognise** their relationship to a right angle: • **use** different measuring tools, such as spirit levels or set squares, as well as created templates, to identify straight and right angles, and to **classify** angles as less than a right angle, between a right and straight angle, and larger than a straight angle.	**Estimate, construct,** and **measure** angles in degrees, with use of appropriate tools including a protractor, and relate these measures to angle names: • **classify** angles as either acute, obtuse, straight, reflex, or a revolution, depending on the measure, then use a protractor to measure angles in degrees, with knowledge of what measure a reasonable result will be. For example, identifying an angle as obtuse, so knowing the measure must be between 90 and 180 degrees.	**Identify** the relationships between angles on a straight line, angles at a point and vertically opposite angles; **use** these to determine unknown angles, **communicate reasoning**: • **use** protractors or geometry software to measure angles formed when lines are crossed and combinations of angles at a point • **determine** unknown angles within right (complementary) and straight (supplementary) angles. For example, knowing that a right angle is equal to 90 degrees, and so if the known size of one part of the angle is 30 degrees, the remaining angle must be 60 degrees, meaning the angles are complementary.

Strand: Measurement

Sub-organiser: Duration of time and telling time

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sequence days of the week and times of the day including morning, lunchtime, afternoon and night-time, and connect them to familiar events and actions: • **sequence** events in the order in which they occurred, using language such as 'this happened *first*, then this happened *next*' • **distinguish** between the days of the school week and weekends, and **recognise** that the days of the week form a sequence that repeats, with Monday always following on from Sunday.	**Describe** the duration and sequence of events using years, months, weeks, days and hours: • **name**, **list** and **use** familiar units of time, such as hours, days, weeks, years • compare the number of days in the months of the year and explain how the months cycle from one year to the next • **discuss** events and activities and deciding whether they would take closer to an hour, a day, a week, a month or a year • **investigate** durations of time represented in First Nations Australians' seasonal calendars.	**Identify** the date and **determine** the number of days between events using calendars: • **use** ordinal numbers to indicate the month and date and locating specific dates on a calendar • **model** calculation problems with a calendar, for example 'How many days are left in this month or year?' • **identify** and **locate** specific days or dates on a calendar; for example, school holidays, sports days, ANZAC Day, Easter, Diwali or Ramadan.	**Recognise** and **use** the relationship between formal units of time including days, hours, minutes and seconds to **estimate** and **compare** the duration of events: • **estimate** how long an activity will take to plan an event and using timers to measure and check estimates of short durations of time • **explore** how cultural accounts of First Nations Australians explain cycles of time that involve the sun, moon and stars.	**Solve** problems involving the duration of time including situations involving 'am' and 'pm' and conversions between units of time: • **understand** the Latin terms ante-meridian as meaning before midday and post-meridian as after midday, dividing the day into two, twelve-hour halves • **calculate** the amount of time between two events, and **convert** between seconds, minutes and hours, **understand** that these units of time are measured in base 60 • **explore** First Nations Australians' explanations of the passing of time through cultural accounts about cyclic phenomena involving sun, moon and stars.		**Interpret** and **use** timetables and itineraries to **plan** activities and **determine** the duration of events and journeys: • **plan** a trip involving one or modes of transport, **investigate** the different ways duration is represented in timetables • **develop** a timetable of daily activities for a planned event, for example, a sports carnival.

		Recognise and **read** the time represented on an analog clock to the hour, half-hour and quarter-hour: • **recognise** and **describe** the relationship between the movement of the hands on an analog clock and the duration of time it represents; for example, connecting the language of 'half past' to mean when the 'big hand' will be at half past the hour and recognising this position as being halfway around its full cycle • **divide** a clockface into halves and quarters, and **connect** the subdivisions with telling the time to the half and quarter hour; **explain** the meaning of 'quarter past' and 'quarter to' referring to the hour.	**Describe** the relationship between the hours and minutes on analog and digital clocks, and **read** the time to the nearest minute: • **represent** and **read** the time on an analog clock using the markings and position of the hands to the nearest minute mark or five-minute interval • **read** and **connect** analog and digital time and using the language of time, such as 'a quarter past 12', applying an understanding of fractions, and knowing that this equates to 12:15.		**Compare** 12- and 24-hour time systems and **solve** practical problems involving the **conversion** between them: • **use** timetables written in 24-hour time, such as flight schedules, to **convert** between 24- and 12-hour time • **convert** between the digital representation of 24-hour time and an analog clock, **match** the same times represented in both systems.	

Achievement standards

Strand: Space

The *Space* strand develops ways of visualising, representing and working with the location, direction, shape, placement, proximity and transformation of objects at macro, local and micro scales in natural and constructed worlds. It underpins the capacity to make pictures, diagrams, maps, projections, networks, models and graphics that enable the manipulation and analysis of shapes and objects through actions and the senses. This includes notions such as surface, region, boundary, curve, object, dimension, connectedness, symmetry, direction, congruence and similarity. These notions apply to art, design, architecture, planning, transportation, construction and manufacturing, physics, engineering, chemistry, biology and medicine.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
By the end of reception, students: • name, create and sort familiar shapes and show their reasoning • describe the position and the location of themselves and objects in relation to other objects and people within a familiar space.	By the end of year 1, students: • make, compare and classify shapes and objects using obvious features • give and follow directions to move people and objects within a space.	By the end of year 2, students: • compare and classify shapes, describing features using formal spatial terms • locate and identify relative positions of features in two-dimensional representations and move position by following directions and pathways.	By the end of year 3, students: • make, compare and classify objects using key features • interpret and create two-dimensional representations of environments.	By the end of year 4, students: • represent and approximate complex shapes and objects in the environment • create and interpret grid reference maps • identify line and rotational symmetry in plane shapes and create symmetrical patterns.	By the end of year 5, students: • connect objects to their two-dimensional nets • use grid coordinates to locate and move positions • perform and describe the results of transformations and identify any symmetries.	By the end of year 6, students: • identify the parallel cross-section for right prisms • locate an ordered pair in any one of the four quadrants on the Cartesian plane • create tessellating patterns using combinations of transformations.

Scope and sequence

Strand: Space

Sub-organiser: Classifying and comparing shapes

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Sort, name and **create** familiar shapes, and describe familiar shapes within objects in the environment, **giving reasons**: • **sort** collections of 2D shapes, such as rectangles, squares, triangles, circles, by their different features, including number of sides, colour, or size, and **describe** how they have been sorted • **create** a picture using a variety of shapes and a range of materials, including objects to trace around, describing the shapes they have created or used and **share** why they chose each shape in their picture • **describe** and **name** shapes within objects that can be observed on Country or Place.	**Make, compare** and **classify** familiar shapes; recognise familiar shapes and objects in the environment, **identify** the similarities and differences between them: • **classify** a collection of 2D shapes, including different circles, ovals, regular and irregular shapes, triangles and quadrilaterals, **explain** what is the same about the shapes in a group and what is different between the groups • **compare** the different objects that can be built out of the same number of blocks or centi-cubes and discussing the differences between them • **explore** string games used in story telling by First Nations Australians; for example, Karda from the Yandruwandha Peoples of north-east South Australia, **recognise**, **compare**, **describe** and **classify** the shapes made by the string and their relationship to shapes and objects on Country or Place.	**Recognise, compare** and **classify** shapes, **reference** the number of sides and using spatial terms such as 'opposite', 'parallel', 'curved' and 'straight': • **sort** a collection of shapes in different ways based on their features such as number of sides, whether all sides are equal, whether pairs of opposite sides are parallel; for example, collections of triangles and other polygons • **manipulate** shapes and **recognise** that different orientations do not change the shape.	**Make, compare** and **classify** objects, to **identify** key features and **explain** why these features make them suited to their uses: • **classify** a collection of 3D shapes, including cylinders, spheres, prisms and pyramids according to key features such as the shape, number of faces, surfaces, edges and vertices • **use** 3D shapes to build geometric objects with materials, **justify** the suitability of shapes to create different designs • **investigate** and **explain** how First Nations Australians' dwellings are oriented in the environment to accommodate climatic conditions.	**Represent** and **approximate** composite shapes and objects in the environment, using combinations of familiar shapes and objects: • **combine** common shapes to create complex shapes. For example, through the creation of a logo • **identify** the shapes used in a combined shape by splitting the shape into a series of common, familiar shapes.	**Connect** objects to their nets and **build** objects from their nets **using** spatial and geometric reasoning: • **determine** which nets will and will not create a particular 3D shape, **reasoning** about the number of and types of faces and their locations in the net • **design** and **construct** nets for packaging, considering how the faces will be joined, and testing by cutting and folding • **investigate** how animal tracks can be interpreted by First Nations Australians using the transformation of their shapes to help determine and understand animal behaviour.	**Compare** the parallel cross-sections of objects and **recognise** their relationships to right prisms: • **use** objects to slice along different cross-sections and **record** the different shapes of faces that result • **recognise** that right prisms contain the same shape and size cross-section as the face parallel to the slice, whereas pyramids result in different sized cross-sections, depending on the location and depth of the cut.

Strand: Space

Sub-organiser: Location

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Describe the position and location of themselves and objects in relation to other people and objects within a familiar space: • **use** location specific language, such as: inside, underneath, on top of, above, below, behind, in front of, next to, and so on • **describe** where they have moved themselves and items in relations to other items within a space; for example, I hid the ball behind the bin over there near the bench.	**Give** and **follow** directions to move people and objects to different locations within a space: • **interpret, follow,** and **give** directions around familiar locations, **use** ordinal and positional language, such as: forwards, backwards, straight ahead, left, right, first last and so on • **create** and **follow** an algorithm consisting of a set of instructions to move an object to a different location • **describe** a familiar journey across Country or Place using directional language.	**Locate** positions in two-dimensional representations of a familiar space; **move** positions by **following** directions and pathways: • interpret maps of familiar places and identify the position of key features • **understand** that we use maps to receive and give directions and to describe place and spatial relationships between places • **follow** and **create** movement instructions that need to be carried out to move through a 4×4 grid mat on the classroom floor or on a computer screen.	**Interpret** and **create** two-dimensional representations of familiar environments, **locate** key landmarks and objects relative to each other: • **create** and **follow** 2D maps including representations of key landmarks and objects to find a specific location within a place • **explore** land maps or cultural maps used by First Nations Australians to locate, identify and position important landmarks such as waterholes.	**Create** and **interpret** grid reference systems using grid references and directions to **locate** and **describe** positions and pathways: • **use** maps with grid references of familiar locations or places of interest and **create** a set of instructions for someone to travel between determined locations • **overlay** a grid over a map and **determine** the coordinates for key landmarks.	**Construct** a grid coordinate system that uses coordinates to locate positions within a space; **use** coordinates and directional language to describe position and movement: • **use** the correct recording conventions for coordinates, such as, recording the x-(horizontal) axis, followed by the y-(vertical) axis • **use** a grid reference system and grid coordinate system and differentiating between the purposes of the two. For example, a grid reference system refers to a space within the grid and may use an alpha-numeric system along the x- and y-axis. A grid coordinate system is numbered along the lines on the x- and y-axis, not the spaces.	**Locate** points in the four quadrants of a Cartesian plane; **describe** changes to the coordinates when a point is moved to a different position in the plane: • **understand** that Cartesian planes provide a graphical representation, describe location in relation to a fixed origin, and can contain different incremental values along the axes, depending on purpose • **understand** how to record an ordered pair, with the horizontal coordinate, or x-axis, written before the vertical coordinate, or y-axis • **draw** lines and polygons on the Cartesian plane, **identify** and list coordinates • **investigate** and **connect** land or star maps used by First Nations Australians with the Cartesian plane through a graphical or visual way of describing location.

Strand: Space

Sub-organiser: Transformation

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				Recognise line and rotational symmetry of shapes and **create** symmetrical patterns and pictures, **using** dynamic geometric software where appropriate: • **identify** line symmetry as an image with two identical halves, that can be either horizontal or vertical, whereas rotational symmetry occurs when an image or shape looks the same when rotated • **create** and **identify** symmetrical patterns, including shapes which have both line and rotational symmetry, such as squares, circles, and equilateral triangles • **explore** the natural environment on Country/Place to investigate and discuss patterns and symmetry of shapes and objects such as in flowers, plants and landscapes.	**Describe** and **perform** translations, reflections and rotations of shapes, using dynamic geometric software where appropriate; **recognise** what changes and what remains the same, and **identify** any symmetries: • **understand** that translations, reflection and rotations can change the position and orientation of a shape, but not the size • **use** materials, such as pattern blocks, to trace around and conduct a series of one-step transformations, showing the original and end position • **create** different combinations of transformations to move a shape from one position to another. **Determine** the possible sequence of transformations made by a given original and end point.	**Recognise** and **use** combinations of transformations to create tessellations and other geometric patterns, **use** dynamic geometric software where appropriate: • **investigate** shapes and whether they will tesselate. For example, using geometric software to create paver and tiling patterns • **create** and **follow** a set of instructions to move a shape on the Cartesian plane, with a series of transformations • **investigate** symmetry, transformation and tessellation in different shapes on Country/Place, including rock formations, insects, and land and sea animals, discuss the purpose or role symmetry plays in their physical structure.

Achievement standards

Strand: Statistics

The *Statistics* strand develops ways of collecting understanding and describing data and its distribution. Statistics provide a story, or means to support or question an argument, and enables exploratory data analysis that underpins decision-making and informed judgement. Statistical literacy requires an understanding of statistical information and processes, including an awareness of data and the ability to estimate, interpret, evaluate and communicate with respect to variation in the real world. Statistical literacy provides a basis for critical scrutiny of an argument, the accuracy of representations, and the validity and reliability of inferences and claims. The effective use of data requires acknowledging and expecting variation in the collection, analysis and interpretation of categorical and numerical variables. Statistics is used in business, government, research, sport, healthcare and media for critical and informed evaluation of issues, arguments and decision-making.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
By the end of reception, students: • collect, sort and compare data in response to questions in familiar contexts.	By the end of year 1, students: • collect and record categorical data • create one-to-one displays • compare and discuss the data using frequencies.	By the end of year 2, students: • use a range of methods to collect, record, represent and interpret categorical data in response to questions.	By the end of year 3, students: • conduct guided statistical investigations involving categorical and discrete numerical data • record, represent and compare data they have collected • interpret their results in terms of the context.	By the end of year 4, students: • create many-to-one data displays • assess the suitability of displays for representing data • discuss the shape of distributions and variation in data • use surveys and digital tools to generate categorical or discrete numerical data in statistical investigations and communicate their findings in context.	By the end of year 5, students: • identify the mode and interpret the shape of distributions of data in context • interpret and compare data represented in line graphs • plan and conduct statistical investigations that collect nominal and ordinal categorical and discrete numerical data through use of digital tools.	By the end of year 6, students: • critique arguments presented in the media based on statistics • compare distributions of discrete and continuous numerical and ordinal categorical data sets as part of their statistical investigations, through use of digital tools.

Scope and sequence

Strand: Statistics

Sub-organiser: Representing and interpreting data

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Collect, sort and **compare** data represented by objects and images in response to given investigative questions that relate to familiar situations: • **collect** and **decide** how to organise data from 'Yes or no' questions. For example, with a class chart or by lining up • **create** classroom charts to represent data; **compare** and **interpret** representations • **investigate** statistical contexts after reading a story to answer a question such as 'How many animals were in the story?'.	**Acquire** and **record** data in various ways including using digital tools, objects, images, drawings, lists, tally marks and symbols: • **discuss** methods of collecting data to answer a question, then **collect** and **review** methods used • **create** a tally to **record** data while observing events such as the year level of students using the bike shed; **decide** on the possible categories before the observations are taken, then **review** the data afterwards to **notice** whether the tally was effective.	**Acquire** data for categorical variables through surveys, observation, experiment and **use** digital tools; **sort** data into relevant categories and **display** data using lists and tables: • **pose** questions for data that can be collected from classmates or within the school, **record** responses in a table and **use** counting strategies to interpret the number of responses for most and least popular • **investigate** questions, such as 'How much rubbish is really rubbish?' by gathering data about objects in categories, for example, throw away, recycle and reuse; deciding whether the data answers the question • **use** familiar software to construct a survey to collect class data • **observe** events and using the observations to design a table or list to record data.	**Acquire** data for categorical and discrete numerical data to address a question of interest or purpose by **observing**, **collecting** and **accessing** data sets; **record** the data using appropriate methods including frequency tables and spreadsheets: • **use** efficient methods of **collect** and **record** data, including written and online surveys and polls, and **represent** this data with lists, tallies, symbols, and tables for interpretations.	**Acquire** data for categorical and discrete numerical variables to address a question of interest or purpose using digital tools; **represent** data using many-to-one pictographs, column graphs and other displays or visualisations; **interpret** and **discuss** the information that has been created: • **investigate** and **construct** many-to-one data displays. For example, a picture graphs where one symbol represents 4 pieces of data, and half of a symbol represents 2 pieces of data.	**Acquire, validate** and **represent** data for nominal and ordinal categorical and discrete numerical variables using software including spreadsheets; **discuss** and **report** on data distributions in terms of highest frequency (mode) and shape, in the context of the data: • **understand** that ordinal data is a form of categorical data, even though the data being collected may be numbers. For example, the use of a likert scale, where the survey participant indicates a rating from 0 to 5 • **identify** the mode as the most occurring piece of data in a set, and recognise that there may be more than one mode • **collect** data through chance experiments, **discuss** and **report** on the distribution of outcomes and how this related to equal and unequal outcomes.	**Interpret** and **compare** data sets for ordinal and nominal categorical, discrete and continuous numerical variables **using** comparative displays or visualisations and digital tools; **compare** distributions in terms of mode, range and shape: • **differentiate** between types of data and **determine** the best mode of display to analyse the data • **determine** the range for a set of data by finding the difference between the highest and lowest value in the set and c**ompare** the range for different data sets • **construct** and **interpret** side-by-side column graphs for numerical data to **compare** the spread and shape of the data • **represent** categorical data with dot plots and bar charts and **analyse** the distribution of the data in terms of the shape.

Strand: Statistics

Sub-organiser: Representing and interpreting data

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	Represent collected data for a categorical variable using one-to-one displays and digital tools where appropriate; **compare** the data using frequencies and **discuss** the findings: • **create** a pictograph with objects or drawings; discussing the possible categories for the pictograph, arrange the objects or drawings into the categories, then reflect on the chosen categories and decide whether they were helpful • **describe** data displays and **draw conclusions** from the data. For example, 'The most popular way to travel to school is by car as this category was the largest' • **represent** data with objects and drawings where one object or drawing represents one data value; **describe** the displays and **determine** the frequency of responses.	**Create** different graphical representations of data using software where appropriate; **compare** the different representations, identify and **describe** common and distinctive features in response to questions: • **use** a range of data displays, such as column graphs, bar charts, lists, tally charts, picture graphs, and dot plots to **represent** data, and **justify** which graphical representation is most useful to interpret • **create** 2 different graphical representations of the same data, discussing and comparing the different representations • **use** digital tools to create picture graphs to **represent** data using one-to-one correspondence, **decide** on an appropriate title for the graph and **consider** whether the categories of data are appropriate for the context.	**Create** and **compare** different graphical representations of data sets including using software where appropriate; **interpret** the data in terms of the context: • **create** and **compare** different graphical representations for the same set of data and **justify** the effectiveness of each.	**Analyse** the effectiveness of different displays or visualisations in the way in which it **illustrates** and **compares** data distributions, then **discuss** the shape of distributions and the variation in the data: • **interpret** graphs from primary and secondary sources and **compare** the similarities, differences, and usefulness of different graph types • **discuss** the shape of the distribution of data for numerical data sets. For example, noticing that in a dot plot for the number of hours of sport played by students in a class, that the distribution is skewed to the right, meaning that more people spend many hours playing sport.	**Interpret** line graphs representing change over time; **discuss** the relationships that are represented and conclusions that can be made: • **read** and **interpret** line graphs, **explain** how the horizontal axis measures time, whereas the vertical axis measures a numerical value, such as money or measurements • **match** unlabelled line graphs to the context they represent based on the stories of the different contexts • **construct** line graphs from data collected over time. For example, the height of a plant over the course of a term to analyse the speed of growth over time.	**Identify** statistically informed arguments presented in traditional and digital media; **discuss** and **critique** methods, data representations and conclusions: • **critically evaluate** data in terms of the message that is being conveyed, who is conveying the message and why, and if the data is potentially misleading. For example, graphs not drawn to scale, data not related to the population about which the claims are made, misleading axes, and so on.

Strand: Statistics

Sub-organiser: Statistical investigation

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			Conduct guided statistical investigations involving the **collection, representation** and **interpretation** of data for discrete and categorical numerical variables with respect to questions of interest: • **apply** the process of a statistical investigation, including to **ask** a question, **collect** data, **display** data, and **analyse** the display • **plan** and **carry out** a whole class investigation and what types of data can be collected. **Draw conclusions** through inferences about the data.	**Conduct** statistical investigations, **collect** data through survey responses and other methods; **record** and **display** data using digital tools; **interpret** the data and communicate the results: • **apply** the process of a statistical investigation to **identify** a question of interest, **create** a method of data collection (either primary or secondary data), **display** the data using digital tools and **analyse** the data to report back findings to the class.	**Plan** and **conduct** statistical investigations. **Pose** questions or **identify** a problem and **collect** relevant data; **choose** appropriate displays and **interpret** the data; **communicate** findings within the context of the investigation: • **pose** questions of interest and **determine** how to conduct a statistical investigation. Follow the four steps of a statistical investigation; **pose** a question, **collect** data, **display** the data, then **interpret** the data in terms of the original question • **trial** and **determine** if the data generated from a survey question provides the necessary and un-biased data to effectively answer a question.	**Plan** and conduct **statistical** investigations. **Pose** and **refine** questions or **identify** a problem and **collect** relevant data; **analyse** and **interpret** the data and **communicate** findings within the context of the investigation: • **collect** data using tools, such as temperature gauges, timers, tape and measurers and **use** spreadsheets to **record** and **represent** the data with appropriate graphical representations • **use** widely available data to **investigate** and **compare** to locally collected data. For example, investigating the claim made by the World Health Organisation that an individual requires at least 50 Litres of water per day to ensure that their most basic needs are met, with data collected on water at home by students from the water meter.

Achievement standards

Strand: Probability

The *Probability* strand develops ways of dealing with uncertainty and expectation, making predictions, and characterising the chance of events, or how likely events are to occur from both empirical and theoretical bases. It provides a means of considering, analysing and utilising the chance of events, and recognising random phenomena for which it is impossible to exactly determine the next observed outcome before it occurs. In contexts where chance plays a role, probability provides experimental and theoretical ways to quantify how likely it is that a particular outcome will occur, or a proposition is the case. This enables students to understand contexts involving chance and to build mathematical models surrounding risk and decision-making in a range of areas of human endeavour. These include finance, science, business management, epidemiology, games of chance, computer science and artificial intelligence.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
This strand starts at Year 3			By the end of year 3, students: • use practical activities, observation or experiment to identify and describe outcomes and the likelihood of everyday events, explaining reasoning • conduct repeated chance experiments and discuss variation in results.	By the end of year 4, students: • order events or the outcomes of chance experiments in terms of likelihood • identify whether outcomes are independent or dependent.	By the end of year 5, students: • conduct repeated chance experiments and list the possible outcomes • estimate likelihoods and make comparisons between those with and without equally likely outcomes.	By the end of year 6, students: • assign probabilities using fractions, decimal and percentages • conduct simulations using digital tools, to generate and record the outcomes from many trials of a chance experiment • compare observed frequencies to the expected frequencies of the outcomes of chance events.

Scope and sequence

Strand: Probability

Sub-organiser: Chance and events

Year 3	Year 4	Year 5	Year 6
Identify practical activities and everyday events involving chance; **describe** possible outcomes and events as 'likely' or 'unlikely' and **identify** some key events as 'certain' or 'impossible' and **explain** reasoning: • **make** predictions as to what would happen next, using the terms 'likely' or 'unlikely'. For example, 'If 10 coloured counters were put in a bag (and the number of each colour told to students) and drawn one by one, how likely it would be for each colour to appear • **classify** a list of everyday events according to how likely they are to happen, using chance vocabulary to justify choices.	**Describe** possible everyday events and the possible outcomes of chance experiments and **order** outcomes or events based on their likelihood of occurring; **identify** independent or dependent events: • **make** mathematical **predictions** and **choices** based on the outcome of events. For example, determining that there is a greater likelihood of drawing a red ball from a bag with 5 red balls and 5 green balls than there is of drawing a red ball from a bag of 20 red balls, 25 white balls and 15 green balls.	**List** the possible outcomes of chance experiments involving equally likely outcomes and **compare** to those which are not equally likely: • **investigate** games with equally likely outcomes and those with unequally likely outcomes. For example, when playing a game where heads represents a win, and tails a loss, there is an equal chance of winning and losing. However, in a game where a win requires two heads, there is not an equal chance of winning, as two heads is only $\frac{1}{4}$ of the total possible outcomes from flipping two coins • **understand** that the probability of an event occurring can be represented using fractions, where the numerator represents the total possible number of times an outcome can occur, and the denominator represents the total number of all outcomes that could occur.	**Recognise** that probabilities lie on numerical scales of 0 to 1 or 0% to 100% and **use** estimated likelihood to **assign** probabilities that events occur in a given context, **use** fractions, percentages and decimals: • **recognise** that on a 0 to 1 scale, 0 represents a 0% chance of an event occurring, and 1 represents a 100% chance of an event occurring • **connect** the language of chance with a 0 to 1 probability scale. For example, 0 representing an event being impossible to occur and 50% equally likely to occur • **use** materials, such as dice, cards and spinners to **calculate** the probability of events occurring and **place** the events along a 0 to 1 number line. For example, calculating that the probability of rolling an even number on a standard 6-sided dice is $\frac{3}{6}$, or 50%, and placing this event halfway along the number line.

Strand: Probability

Sub-organiser: Experiments and simulations

Year 3	Year 4	Year 5	Year 6
Conduct repeated chance experiments; **identify** and **describe** possible outcomes, **record** the results, **recognise** and **discuss** the variation: • **make** a mathematical **prediction** of the outcome of an event, such as tossing a coin 10 times, throwing a dice, or drawing a ball from a bag, and **compare** and **notice** the variation between predictions and actual results.	**Conduct** repeated chance experiments to observe relationships between outcomes; **identify** and describe the variation in results: • **reason** the outcomes of independent and dependent events. For example, when flipping a coin, the likelihood of a heads appearing is not dependent on what was flipped previously, as a coin has no memory, therefore this is an independent event. When drawing coloured balls from a bag and not replacing them, the likelihood of drawing a certain colour is dependent on what has been drawn previously, making this a dependent event.	**Conduct** repeated chance experiments including those with and without equally likely outcomes, **observe** and **record** the results; **use** frequency to compare outcomes and estimate their likelihoods: • **determine** the likelihood of outcomes based on the probability of each occurring, then **compare** this to the experimental outcomes. For example, if flipping a coin 10 times, the probability of a heads occurring is $\frac{5}{10}$, as is the probability of tails occurring. When conducting a trial of this experiment, the coin may land on heads $\frac{7}{10}$ and on tails $\frac{3}{10}$ times • **experiment** with and **record** the outcomes of spinners with equal-coloured regions, compared with those with unequal regions • **investigate** First Nations Australian children's instructive games; for example, Diyari koolchee from the Diyari Peoples near Lake Eyre in South Australia, to conduct repeated trials and explore predictable patterns, using digital tools where appropriate.	**Conduct** repeated chance experiments and **run** simulations with a large number of trials **using** digital tools; **compare** observations with expected results and **discuss** the effect of increasing the number of trials: • **observe** what happens when the number of trials is increased, **notice** that the more times an experiment is conducted, the closer the experimental outcomes will become to the expected outcomes, known as the Law of Large Numbers.