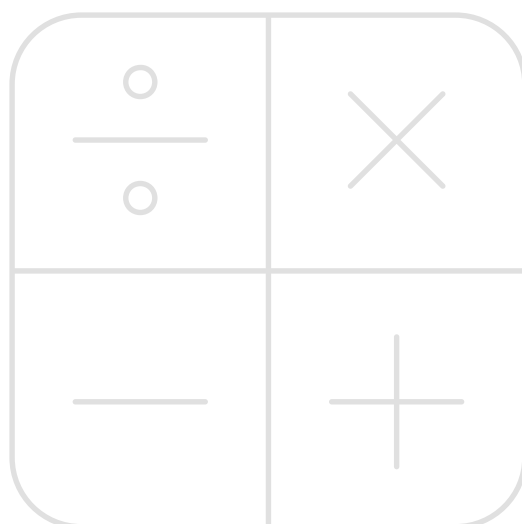




PAT Maths

Strands and achievement
band descriptions



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PAT Maths strands

Number and algebra

Whole number operations

Whole number operations refer to the four basic arithmetic operations of addition, subtraction, multiplication, and division. These are the fundamental operations that form the basis of much of the mathematics that people are called to do in their everyday life. Students need to be able to recognise situations in which these operations are relevant and work with these operations flexibly and efficiently.

Fractions and decimals

Fractions and decimals involve working with quantities expressed as fractions, decimals or percentages and the relationships between these. At higher levels this can include ratios and proportional reasoning, index notation and surds.

Money and financial mathematics

Money and financial mathematics refers to students' proficiency with handling Australian currency (mainly coins, but also some notes). It also refers to students' familiarity and proficiency with financial transactions relevant to everyday life. At the lower bands, this is mainly within the context of making purchases and the calculation of change. At the higher bands, contexts extend to profit and loss, percentage discounts, and saving and borrowing, including ideas of simple and compound interest.

Patterns and algebra

At the lower bands, patterns and algebra involve simple ideas of count and order such as one-to-one correspondence, counting and skip counting, using simple ordinal language, and finding missing numbers in simple number sequences and number sentences. As students progress up the scale, they extend visual and numerical sequences to find future terms; describe rules for given sequences; use pronumerals in place of unknown values or variables; work with linear and simple quadratic expressions; solve linear equations; expand and factorise linear and simple quadratic expressions; and describe relationships using words, symbols, table, and graphs.

Measurement and space

Measurement

Measurement involves the concepts of length, area, volume, capacity, mass, time, and temperature.

Important skills in measurement include the ability to use clocks, timetables, and calendars to solve problems, the ability to read and interpret a variety of different types of measurement scales, the ability to convert between metric units, and the exploration of relationships between length, area, and volume for a variety of shapes and objects, including the application of these relationships to solve problems in context.

At the upper bands of achievement, proportional reasoning is an essential cognitive skill in order to effectively solve problems involving circle properties and trigonometric ratios.

Space

Space comprises several key ideas:

1. the concept of shape, referring to the recognition, visualisation and description of key features of common two-dimensional shapes and three-dimensional objects
2. navigation through a space, including the ability to use language to describe direction and position; and the ability to read, interpret and construct maps at varying levels of complexity and detail
3. symmetry, including an understanding of the main symmetrical relationships (reflection, rotation, translation) in a variety of contexts. In the middle and upper achievement bands, the idea of similarity and the enlargement transformation are also introduced
4. the relationship between line and angle, in particular, the angle relationships associated with triangles, quadrilaterals, parallel lines and transversals are explored.

Statistics and probability

Statistics

At the lower bands of achievement, students' experience with statistics is limited to very simple interpretations of everyday, familiar data using simple tables, tally charts, picture graphs, column graphs, and simple pie graphs. As students progress in their understanding, they begin to work with more complex data (both categorical and numerical) and can use a wider range of means to display this data including line graphs, scatter plots, dot plots, two-way tables, Venn diagrams, stem-and-leaf plots, and box plots.

At the upper bands of achievement, students can accurately identify and describe general trends in a data set and can calculate the mean, median and mode of grouped data.

Probability

At the lower bands of achievement, students' understanding of probability is limited to very simple descriptions of everyday, familiar chance events using informal terms such as 'even chance', 'good chance' and words such as 'impossible', 'unlikely', 'likely', and 'certain'. As students progress in their understanding, they begin to assign numerical values (fractions) to describe chance for simple experiments such as tossing a coin, picking an object from a bag or rolling a dice. With further progress, equivalent forms for assigning probabilities, such as decimals and percentages, are also recognised and the complexity of events and experiment explored is gradually increased from simple to compound events or one-step to multi-step processes. At the upper bands of achievement, students also use a wider variety of structured diagrams and tables such as Venn diagrams, two-way tables and tree diagrams to list the sample space of a given experiment and explore and analyse the outcomes of probability experiments.

Using achievement bands

While a scale score indicates a student's achievement level and can be used to quantitatively track a student's growth, it is only in understanding what the number represents that teachers can successfully inform their practice to support student learning. For this reason, the PAT scale has been divided into achievement bands that include written descriptions of what students are typically able to do at that band (band description).

Students in the same achievement band are operating at approximately the same achievement level within a learning area regardless of their school year level. Viewing student achievement in terms of achievement bands may assist in grouping students of similar abilities. A student scoring in a particular band can be expected to have some proficiency in that band and be progressively more proficient with the Maths knowledge, skills, and understanding outlined in lower bands.

A PAT Maths scale score of 105 could be considered to be at the upper end of achievement band 95–104 or at the lower end of achievement band 105–114. In cases like these, it is important to reference the descriptions of both achievement bands to understand the student's abilities

PAT Maths

achievement bands

155 and above

Number and algebra

Whole number operations

Students are able to use complex proportional reasoning involving multi-digit whole numbers and multiple variables. They use estimation to anticipate an approximate solution and to evaluate the reasonableness of solutions to complex arithmetical calculations. They use number properties and characteristics to satisfy multiple constraints.

Fractions and decimals

Students are able to use complex proportional reasoning, multiple variables, and numbers expressed as decimals, fractions, percentages, ratios, indices, and logarithms. They use estimation to anticipate an approximate solution and to evaluate the reasonableness of solutions to complex arithmetical calculations.

Money and financial mathematics

Students are able to use complex proportional reasoning involving multi-digit numbers and multiple variables (for example, percentage increase and decrease, and determine the original price from a given discounted sale price).

Patterns and algebra

Students are able to explore and identify characteristic of a wide range of functions (for example, polynomial, cubic, reciprocal, circles) and their graphs, such as gradient, local maximum and minimum points, intercepts, points of inflexion, asymptotes and tangent lines. They can also interpolate and extrapolate linear and quadratic sequences.

Measurement and space

Measurement

Students are able to apply knowledge of volume and surface area of a variety of three-dimensional objects, for example, calculate the diameter of a cylinder to fulfil given volume constraints.

Space

Students are able to interpret and use complex scale maps, coordinate maps and scale diagrams (for example, use a scale diagram and given diameter to calculate the circumference of a circular design). They can use geometrical knowledge, skills and reasoning in contexts involving a three-dimensional coordinate system, including trigonometry applications. They can apply circle geometry in a range of contexts.

Statistics and probability

Statistics

Students are able to analyse statistical information of various types to justify an opinion or evaluate a statement.

Probability

Students are able to evaluate the fairness of games of chance and identify how to modify unfair games to make them fair.

145–154

Number and algebra

Whole number operations

Students are able to interpret and use numbers of different kinds (for example, very large whole numbers expressed in scientific notation). They also use estimation and approximation to monitor and evaluate problem solutions and use formal representations of ratio and proportion in contexts involving proportional reasoning and more than two variables.

Fractions and decimals

Students are able to interpret and use numbers of different kinds (for example, indices and logarithms and the laws that govern them, and fractions in different forms and expressed with differing levels of precision). They also typically use estimation and approximation to monitor and evaluate problem solutions. They use formal representations of ratio and proportion in contexts involving proportional reasoning and more than two variables.

Money and financial mathematics

Students are able to formulate and use relationships among variables in a variety of contexts, for example, financial calculations related to interest, profit or discounts, and using and extending given models.

Patterns and algebra

Students are able to flexibly employ a wide variety of strategies to solve problems such as: expanding both linear and quadratic algebraic expressions; substituting a given expression to evaluate another expression; simplifying algebraic expressions using index laws; subtracting two algebraic fractions and simplifying the answer; and matching linear and quadratic graphs to their corresponding equations.

They can recognise and manipulate alternative representations (symbolic, graphic and tabular) of linear and quadratic functions; use linear sequences and simple quadratic sequences; interpret and solve pairs of simultaneous equations; and interpret graphical representations of functional relationships (for example, features of a distance–time graph such as relating gradient of the graph to speed).

Measurement and space

Measurement

Students are able to calculate volume, capacity, area, mass, and time (including time zones) in a range of contexts. They can also apply multi-dimensional unit conversion (for example, square centimetres to square millimetres, cubic centimetres to litres, and kilometres per hour to metres per second).

Space

Students are able to establish knowledge of circle properties and connections between them (circumference, radius, diameter, area, angles, chords, arcs, segments, sectors, and tangents). They can also recognise and use angles in space and trigonometric ratios (for example, estimating location in navigation, angles of elevation and depression). They establish symbolic and graphical representations of trigonometric functions, and they interpret and use scale maps and scale diagrams.

Statistics and probability

Statistics

Students are able to interpret and synthesise data represented in different ways, such as in tables (two-way tables and grouped data), grouped column graphs, histograms, line graphs, and scatter plots. They can also calculate, interpret, and use measures of central tendency and dispersion from a variety of data sources including grouped data.

Probability

Students are able to analyse outcomes of probability experiments involving compound events (for example, rolling two dice) and also work out permutations and combinations involving up to four choices.

135–144

Number and algebra

Whole number operations

Students are able to work flexibly with all four operations with multi-digit numbers and integers (including negative numbers). They recognise the inverse property of the addition/subtraction and multiplication/division operations and are able to use these efficiently to solve problems. They are also typically able to employ the associative and distributive laws to identify equivalent expressions.

Fractions and decimals

Students are able to interpret and use complex ideas of place value in decimal numbers, including by rounding to a given degree of precision, ordering decimal numbers, and representing these on a number line. They are also able to identify and use an appropriate formulation to carry out arithmetic operations with fractions, decimals and percentages, and use proportional reasoning in contexts with more than two variables.

Money and financial mathematics

Students are able to work out the size of a percentage reduction given the original price and the sale price.

Patterns and algebra

Students are able to recognise and use a simple non-linear relationship (for example, a quadratic sequence expressed in a table of values). They can formulate algebraic expressions to represent relationships in real-life problem situations (for example, formulae for area and volume calculations). They can use knowledge of number properties (for example, commutative, associative, and distributive laws) to manipulate linear algebraic expressions, equations, and inequations (for example, to expand, factorise, simplify, substitute, and solve). They can interpret graphical representations of functional relationships derived from familiar contexts (for example, find the distance travelled in a given time from a distance–time graph).

Measurement and space

Measurement

Students are able to use measures expressed as rates, ratios, and proportions in a range of contexts (for example, speed, fuel consumption, scale factors in maps and similar figures). They can also apply spatial reasoning and knowledge of properties of shapes and objects (for example, perimeter, area, surface area, and volume) with irregular and compound shapes in a range of contexts.

Space

Students are able to recognise and use the angle relations in polygons, and with lines and points in a plane. They can also derive and recognise trigonometric ratios (for example, in unit circle and in right-triangles) and apply shape transformations (that is, reflection, rotation, translation, and enlargement/ reduction) to compound shapes and packaging design (for example, where specific markings on a net need to be matched with specific faces on a folded box). They can also apply spatial reasoning and knowledge of properties of shapes and objects (for example, relationships between side-length, and relationships between angles, and similar and congruent figures).

Statistics and probability

Statistics

Students can retrieve data from a variety of statistical representations, including line graphs, box plots, stem-and-leaf plots, segmented (stacked) column graphs, frequency tables of grouped data, and two-way tables. They can calculate and use the mean, median, and mode for ungrouped data in a variety of contexts. They can also compare two sets of data to solve problems or draw conclusions.

Probability

Students are able to use a wide range of techniques such as tree diagrams, Venn diagrams, and two-way tables to represent and explore possible outcomes of chance events and experiments, including compound events.

125–134

Number and algebra

Whole number operations

Students are able to locate integers on a number line and recognise relationships among them. They can also use positive and negative numbers to carry out arithmetic operations involving two or three steps. They can use place value to recognise the structure used to say, label, write, order, round, compose, and decompose very large numbers, as well as use index notation to label, write, compare, compose, and decompose numbers and to evaluate and simplify expressions.

Fractions and decimals

Students are able to use place value to recognise the structure used to say, label, write, order, round, compose, and decompose very small (fractional) numbers. They can use fractions expressed in different ways (decimals, proper and improper fractions, and percentages) to carry out arithmetic operations involving two or three steps (for example, converting fraction denominators then adding). They can also use formal ratio relationships and proportional reasoning with two variables.

Money and financial mathematics

Students are beginning to solve problems involving simple percentage discounts. They can apply a percentage discount to calculate the sale price of an item given its original price.

Patterns and algebra

Students are able to use pronumerals to represent variables or unknown quantities including in a real-life situation. They use knowledge of number properties (for example, commutative, associative, and distributive laws) to recognise equivalent expressions and to generalise number relationships (for example, in working with odd and even numbers). They can also recognise, describe, represent and apply linear relationships between two variables in a variety of contexts. They can recognise and describe complex number sequences (for example, the Fibonacci sequence) and apply this knowledge to find a future term in the sequence.

Measurement and space

Measurement

Students are able to apply an understanding of rates expressed in different units of time. They can read a scale where interpolation between labelled scale points is required. They can apply uni-dimensional unit conversion (for example, centimetres to millimetres, millilitres to litres, kilograms to tonnes), and can apply knowledge of properties of shapes and objects (for example, perimeter, area, and surface area) in a range of contexts. They can recognise and apply the side relationships of a right triangle (Pythagoras' Theorem) and can recognise that the volume of a cuboid can be calculated as the product of length, width, and height.

Space

Students are able to apply spatial reasoning and knowledge of properties of shapes and objects (for example, relationships between side-lengths and relationships between angles) in a range of contexts. They can recognise and use angle relationships associated with intersecting lines. They can match cubes, cuboids (including open boxes), and triangular prisms to their nets. They can match images of three-dimensional objects to their plan views (top, side, front, and back), and can apply shape transformations (that is, reflection, rotation, translation and, enlargement/reduction).

Statistics and probability

Statistics

Students are able to interpret two-way tables, column graphs, line graphs, and pie charts involving percentage values. They can evaluate conclusions provided to determine whether they are supported by given data. They can identify relationships within displays of bivariate data and can calculate and use summary statistics (for example, measures of central tendency, and dispersion) for ungrouped data. They can recognise the factors that relate to selection of a representative sample for a data collection exercise.

Probability

Students are able to list elements in the sample space for simple probability experiments and simple games of chance and compare the probability of different outcomes. They can also find the expected number of occurrences of a specific outcome when a simple chance experiment is repeated several times.

115–124

Number and algebra

Whole number operations

Students are able to use large numbers, including bridging across tens, hundreds, and thousands. They can apply the commutative, associative, and distributive laws to calculations and recognise that different outcomes occur depending on the order in which operations are carried out. They use proportional reasoning in a variety of contexts (for example, to scale up the ingredients in a recipe).

Fractions and decimals

Students are able to use index notation to represent square numbers. They can recognise inverse relationships such as square/square root and cube/cube root and can locate approximate values of roots of non-square numbers. They can recognise, compare, and use fractions and their different equivalent representations, including decimals and percentages.

They can represent the remainder of a division as a fraction or a decimal and they can use proportional reasoning in a variety of contexts (for example, use an exchange rate to convert a quantity from one currency to another or to scale up the ingredients in a recipe).

Money and financial mathematics

Students are able to solve more complex problems involving skills such as the use of an exchange rate to convert from one currency to another and the comparison of an upfront payment to payment in instalments.

Patterns and algebra

Students are able to recognise, describe, represent with symbols, and apply simple functional relationships between two variables in a concrete context (for example, find the relationship between the number of adjoining tables and the number of chairs that fit around them). They can also interpret and solve 'missing number' equations involving mixed operations or multiple steps.

Measurement and space

Measurement

Students are able to use a range of representations of time (for example, calculate time elapsed in hours, convert 24-hour time to 12-hour time, and convert time in fractions of an hour to minutes – such as one-third of an hour – and compare rates).

They can also calculate the perimeter of polygons and recognise that the area of a rectangle is length multiplied by width. These students can interpolate from a measurement scale that has unlabelled subdivisions and can recognise the standard prefixes of the metric system and the relationships within and between them. They can also measure angles in degrees and recognise formal conventions for naming angles and labelling angles on diagrams.

Space

Students are able to recognise relationships among features of linked geometric objects (for example, recognising different views of an object and cross-sections of three-dimensional figures). They can recognise defining and limiting characteristics of two- and three-dimensional shapes (for example, side-length properties in two-dimensional shapes, and relationships among faces, vertices, and edges in three-dimensional shapes). They can recognise the result of single-step transformations (for example, a rotation by a given fraction of a turn, reflection along a given mirror line, or enlargement by a given scale factor) These students can also use instructions in relation to direction of movement, position, and distance to visualise movement through a physical space or on a map.

Statistics and probability

Statistics

Students are able to calculate the mean (average) and range of a dataset and solve problems involving the mean. They can retrieve and interpret data from tables, column graphs (including two-category column graphs and those involving grouped data), and pictographs (including those that use a symbol for multiple and fractional units and half symbols) and can identify different representations of the same dataset. These students can also evaluate a small set of given survey sampling methods to identify the method that best meets the survey purpose.

Probability

Students are able to assign numerical values (fractions, simple decimals, and simple percentages) to describe the probability of simple chance events, such as scoring a given number on a spinner or dice. They recognise that probability values can be placed on a continuum from 0 (impossible) to 1 (certain). They can also identify all the possible outcomes (sample space) from a situation involving a limited number of variables using a systematic approach (for example, list all the different pairs that are possible when selecting from four objects).

105–114

Number and algebra

Whole number operations

Students are developing fluency (making connections, thinking, and working flexibly) with formulating and carrying out calculations in a wide range of contexts. They are able to use proportional reasoning and multiplicative thinking to interpret and use simple ratios, proportions, and rates expressed informally. They can also interpret remainders appropriately in situations involving division.

Fractions and decimals

Students are able to use a number line to represent relative locations of whole numbers, common fractions with related denominators, and decimal fractions with tenths and hundredths. They can use proportional reasoning and multiplicative thinking to interpret and use simple ratios, proportions, and rates expressed informally. They can recognise fractions (and their different equivalent representations) represented either as parts of a whole, or part of a set of objects. They can calculate simple fractions of whole numbers, and they also recognise the meaning of the percentage symbol (%).

Money and financial mathematics

Students are able to identify sets of coins that are equivalent in value, for example, the number of 10-cent coins needed to make up the same value as a 50-cent coin and a 20-cent coin. They can also calculate change from small amounts.

Patterns and algebra

Students are able to recognise and continue a pattern in a visual or numeric sequence involving doubling or other simple multiplicative process. They can continue a visual or numeric pattern to find an element that occurs later in the sequence. They can also interpret and solve missing number equations involving addition, subtraction, multiplication, and division, and use two orthogonal number lines (the Cartesian coordinate system) to locate or describe points in a plane.

Measurement and space

Measurement

Students are able to read time on digital and analogue clocks to the minute, can perform time calculations including am/pm time, and can find the time difference between two times (analogue or digital).

They understand the concepts of perimeter and circumference and can measure the perimeter of different figures. They can use grid squares to calculate the area of irregular shapes and count small cubes to calculate the volume of compound objects composed of cuboids of various sizes. They can also estimate angle size in relation to reference angles, such as right angles or straight angles.

Space

Students are able to recognise, create and use tessellations of two-dimensional shapes. They can recognise relationships among features of linked geometric objects (for example, match a range of three-dimensional objects to their nets) and can interpret instructions that use positional language to solve problems (for example, use of the words clockwise and anticlockwise to describe the direction of a turn). They can read and interpret simple maps in order to perform tasks such as using a simple scale to calculate a distance and describing the direction of one landmark from another.

Statistics and probability

Statistics

Students are able to design simple survey questions to gather data. They can organise given or collected data into an appropriate representation such as a pictograph, column graph, or table. Students can also retrieve and interpret data displayed as a pictograph where the symbol represents more than one unit, a two-category column graph or a column graph with a vertical axis that represents a measured quantity rather than a frequency, and a two - way table or tally chart.

Probability

Students are able to use the language of chance (more likely, less likely, impossible, and certain) to describe everyday events and the outcomes of simple probability experiments (for example, rolling dice, spinning a spinner, and picking objects from a bag). They can also express as a fraction the chance of a given event in a simple probability experiment.

95–104

Number and algebra

Whole number operations

Students are able to interpret a familiar context to identify and use appropriate standard algorithms for the arithmetic operations. They can use estimation to recognise and evaluate reasonableness of results. They also recognise inverse relationships among the arithmetic operations.

Fractions and decimals

Students are able to use place value to recognise the structure used to say, label, and write numbers with decimal fraction parts. They can also recognise visual representations of simple unit fractions (for example, one-quarter or one-third) and multiples of these unit fractions, and they can link visual representations with the appropriate fraction notation.

Money and financial mathematics

Students are able to interpret a familiar context to identify and use appropriate standard algorithms for the arithmetic operations, including money arithmetic (such as calculating change).

Patterns and algebra

Students are able to compare and order multi-digit numbers. They can identify relative positions of numbers in extended sequences and can use large ordinal numbers (such as 64th and 70th). They can also identify irregularities in simple counting patterns (for example, find a missing number in a pattern involving skip counting starting from any point).

Measurement and space

Measurement

Students are able to interpret a monthly calendar to read a day of the week for a given date or find the date for a given day, and they can work out the date one week before or after a given date. They can read time to the half hour on an analogue clock. They can work out the difference (in hours) between two times shown on an analogue clock. These students can calculate when an activity will end, given a starting time on the hour, where the duration of the activity is less than one hour.

They can measure the length of an object using the appropriate device and units (for example, a ruler marked in centimetres and millimetres). They can also identify the appropriate units and measurement tools to measure the area, volume, and mass of familiar objects and materials (for example, use grid squares to quantify the area of regular shapes, small cubes to quantify the volume of cubes or cuboids, and a standard weight to measure mass on a balance).

Space

Students are able to recognise and use directional language that varies with different frames of reference (for example, use left and right to give and interpret directions). They can recognise relationships among features of linked geometric objects (for example, match a familiar three-dimensional object to its net). They can recognise characteristics of different two-dimensional shapes (for example, sides, vertices and informal angle characteristics, lines of symmetry), and they can follow directions using compass points.

Statistics and probability

Statistics

Students are able to represent category counts as a tally chart, pictograph, or column graph. They can also interpret column graphs and pictographs, where the symbol represents more than one unit, to solve problems that involve consideration of two or more data categories.

Probability

Students are able to predict results in qualitative terms from simple probability experiments (for example, identifying the colour that is most likely to be spun on a spinner).

85–94

Number and algebra

Whole number operations

Students are able to recognise and use symbols for the four arithmetic operations. They can solve arithmetic problems with numbers up to two digits using support materials, mental methods, or written algorithms. They can also explore properties of numbers (for example, existence of factors and related number facts).

Fractions and decimals

Students are mainly working with the concept of a half and are able to recognise half of a set of objects or half of a shaded area using visual aids such as a diagram or a set of concrete materials.

Money and financial mathematics

Students can identify sets of coins that add to a specified amount.

Patterns and algebra

Students are able to count forwards or backwards in fixed steps (for example, by 2, 5, 10, and 100). They use place value to recognise the structure used to say, label, write, decompose and compose, order, and round multi-digit whole numbers, including numbers containing zero. They can use zero as a location on the number line and they can continue a repeating pattern of multiple elements or identify missing elements in it.

Measurement and space

Measurement

Students are able to read and interpret calendars to order days of the week and identify the number of days in a specified month. They can measure length using a metre ruler or a ruler marked in centimetres beginning at zero. They can also compare the area of different shapes (for example, using a grid) and the capacity of different containers (for example, using sand, rice, or water).

Space

Students are able to recognise characteristics and defining features of familiar two- and three-dimensional shape types (for example, the number of sides, corners, and angles of all triangles, equal angles in a square, radius, and diameter of circles) and features that can vary (for example, size and orientation). They can compare and classify three-dimensional shapes according to properties such as the number of faces, edges, and corners. They can recognise symmetry properties of familiar objects (for example, reflection in a mirror, matching images across a fold line, simple repeating tiling patterns, and simple rotations such as half turn and quarter turn). They can also identify shapes that are identical (congruent) even when in different orientations and interpret simple grid maps using alphanumeric grid references.

Statistics and probability

Statistics

Students are able to represent category counts (in single digits) as a tally chart or pictograph. They can also interpret simple graphs, tally charts, and pictographs to solve problems (for example, to calculate a total represented by several rows on a tally chart).

Probability

The skills in this sub-strand begin to be developed at a higher band.

75–84

Number and algebra

Whole number operations

Students are able to recognise and use symbols for arithmetic operations and relationships (+, -, =). They can solve one-digit addition and subtraction problems represented in different ways (for example, with pictures, with concrete materials such as money, in a story). They use strategic thinking supported by manipulatives/ concrete materials to work with quantities in a variety of familiar contexts (for example, arranging objects, counting objects in a circle, and doubling and halving).

Fractions and decimals

The skills in this sub-strand begin to be developed at a higher band.

Money and financial mathematics

Students are able to use ideas of place value to recognise the structure used to say, label, write, decompose, and compose two-digit whole numbers, including money amounts.

Patterns and algebra

Students are able to count reliably by ones, backwards, and forwards. They can use ideas of place value to recognise the structure used to say, label, write, decompose, and compose two-digit whole numbers. They can recognise the relative position (order) of numbers in a linear sequence as informal use of a number line. They understand and can use the concept of zero, and they can also continue a repeating pattern of multiple elements or identify a missing unit in it.

Measurement and space

Measurement

Students are able to read time from a digital clock to the minute and read time from an analogue clock to the hour. They can calculate a simple time difference between two times in hours (for example, 2 o'clock to 4 o'clock) and they recognise measures of time (second, minute, hour, day, week, month, year, and season). These students can use informal language and units to quantify measures of length, area, capacity/volume, and angle (for example, How many hand-spans long is this object? How many

cups to fill this container? Turn all the way around; Make a half turn). They can also compare measurable properties of objects where direct comparison may not be possible (for example, comparing length of curved and straight lines). They recognise the terms half of and double (for example, halving in relation to a regular shape or doubling the length of an object), and they can compare the mass of objects (for example, using hefting or a simple balance).

Space

Students are able to use positional language to describe and interpret directions (for example, between, in front of, behind and opposite) and to distinguish left from right. They can compare, match and classify two-dimensional shapes (for example, circle, square, rectangle, and triangle) according to properties such as the number of sides, corners, and informal angle properties. They can also select and use shapes to fill a space without gaps or overlap (for example, complete a geometric puzzle or pattern).

Statistics and probability

Statistics

Students are able to retrieve information from a simple graph or tally chart to identify the number in a specified category (single digits). They can also compare data values represented in a simple graph to draw an inference such as the least or the greatest.

Probability

The skills in this sub-strand begin to be developed at a higher band.

65–74

Number and algebra

Whole number operations

Students are able to model the arithmetic operations of addition, subtraction, multiplication, and division using concrete and informal processes. They use strategies such as counting on, counting back, counting all, grouping, and sharing (including where a remainder occurs) to apply simple arithmetic processes involving a single operation in a familiar context.

Fractions and decimals

The skills in this sub-strand begin to be developed at a higher band.

Money and financial mathematics

Students are able to compare the value of different coins in their local currency and recognise that the value of a coin is not related to its size.

Patterns and algebra

Students are able to continue a simple repeating pattern of two elements (for example, AABAAB). They can also identify any missing elements within this type of pattern.

Measurement and space

Measurement

Students are able to recognise informal angle concepts to describe degree of a rotation using simple terms (for example, sharp turn or door open wide). They can sequence and describe events in time using informal comparison (for example, before/after, older/younger, and which event takes longer?). They can compare objects in relation to a single property (for example, to find which is longest/empty/nearly full/full from a set of objects).

Space

Students are able to interpret and apply positional terms such as next to, onto, or under. They can recognise and name geometric attributes of two-dimensional shapes (for example, number of sides or corners, inside/outside, and curved/straight). These students can also compose a larger shape from a small number of given shapes and decompose a larger shape.

Statistics and probability

Statistics

Students are able to classify and sort familiar objects into groups according to simple attributes (for example, colour, number of legs, and type of toy). Students begin to develop subsequent skills in this sub-strand (beyond grouping and sorting) at a higher band.

Probability

The skills in this sub-strand begin to be developed at a higher band.

64 and below

Number and algebra

Whole number operations

Students are able to recognise and use the concept of quantity and recognise that number labels are used to represent quantities. They recognise and use single-digit numbers written as numerals or represented verbally or visually (for example, by using counters).

Fractions and decimals

The skills in this sub-strand begin to be developed at a higher band.

Money and financial mathematics

Students are able to identify the value of individual coins in their local currency.

Patterns and algebra

Students are able to use simple and familiar ordinal language (first, second, and middle). They can recognise a numeric sequence or a pattern involving single-digit numbers (represented by numerals or shapes). They also associate physical attributes of objects with a particular meaning (for example, coins, traffic lights, or bartering objects).

Measurement and space

Measurement

Students are able to label, classify and sort familiar objects and use informal language to describe them (for example, 'this stick is shorter', 'that is a bigger mat', 'this container is full', 'this object is heavier', 'this side is straight', and 'that side is curved'). They recognise regularity and change in events over time (for example, daily routine and growth). They can also make comparisons among objects that are aligned, allowing for direct comparison of attributes (for example, relative height of students in a group).

Space

Students are able to label, classify, and sort familiar objects and use informal language to describe them (for example, 'this shape is fat', 'that shape is thin' and 'this side is straight, that side is curved'). They can also match shapes or pictures to complete a puzzle.

Statistics and probability

Statistics

Students are able to classify and sort familiar objects into groups according to simple attributes (for example, colour, number of legs, and type of toy).

Probability

The skills in this sub-strand begin to be developed at a higher band.