	Using and applying mathematics		
	Problem solving	Communicating	Reasoning
L5	♦ identify and obtain necessary information to carry through a task and solve mathematical problems, e.g. - *recognise information that is important to solving the problem, determine what is missing and develop lines of enquiry* - *break a several-step problem or investigation into simpler steps* - *consider efficient methods, relating problems to previous experiences* ♦ check results, considering whether these are reasonable, e.g. - *check as they work, spotting and correcting errors and reviewing methods* ♦ solve word problems and investigations from a range of contexts e.g. - *use mathematical content from levels 4 and 5 to solve problems and investigate* Level 5	♦ show understanding of situations by describing them mathematically using symbols, words and diagrams, e.g. - *organise their work from the outset, looking for ways to record systematically* - *decide how best to represent conclusions, using appropriate recording* - *begin to understand and use formulae and symbols to represent problems* Level 5	♦ draw simple conclusions of their own and give an explanation of their reasoning e.g. - *explain and justify their methods and solution* - *identify more complex patterns, making generalisations in words and begin to express generalisations using symbolic notation* - *use examples and counter examples to justify conclusions* Level 5
L4	♦ developing own strategies for solving problems, e.g. - *make their own suggestions of ways to tackle a range of problems* - *make connections to previous work* - *pose and answer questions related to a problem* - *check answers and ensure solutions make sense in the context of the problem* - *review their work and approaches* ♦ use their own strategies within mathematics and in applying mathematics to practical context - *use mathematical content from levels 3 and 4 to solve problems and investigate* Level 4	♦ present information and results in a clear and organised way, e.g. - *organise written work, for example record results in order.* - *begin to work in an organised way from the start* - *consider appropriate units* - *use related vocabulary accurately* Level 4	♦ search for a solution by trying out ideas of their own, e.g. - *check their methods and justify answers* - *identify patterns as they work and form their own generalisations / rules in words* Level 4
	Insufficient evidence	Insufficient evidence	Insufficient evidence

Ma1 overall level Read the complete level descriptions overleaf to confirm the level. Then consider whether the level is low, secure or high

Level 4		
low	secure	high

Level 5		
low	secure	high

Ma1 Using and Applying, Level 5

In order to carry through tasks and solve mathematical problems, pupils identify and obtain necessary information. They check their results, considering whether these are sensible. Pupils show understanding of situations by describing them mathematically using symbols, words and diagrams. They draw simple conclusions of their own and give an explanation of their reasoning.

Ma1 Using and Applying, Level 4

Pupils are developing their own strategies for solving problems and are using these strategies both in working within mathematics and in applying mathematics to practical contexts. They present information and results in a clear and organised way. They search for a solution by trying out ideas of their own.

Calculating					
Counting and understanding numbers		Knowing and using number facts			Using and applying mathematics
Numbers and the number system	Fractions, decimals, percentages, ratio and proportion	Operations, relationships between them	Mental, written and calculator methods	Solving numerical problems	Algebra
♦ use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect ♦ round decimals to the nearest decimal place ♦ order negative numbers in context ♦ recognise and use number patterns and relationships e.g. - *find two-digit prime numbers* - *make generalisations about sequences saying whether much larger numbers will be in the sequence or not*	♦ use equivalence between fractions, e.g. - *convert fractions such as $^2/_5$ into tenths or hundredths and express them as decimals or percentages and vice versa* - *reduce a fraction to its simplest form by cancelling common factors* ♦ order fractions and decimals e.g. - *order fractions with different denominators* - *order decimals that have a mixture of 1, 2 or 3 decimal places* ♦ understand simple ratio	♦ use known facts, place value and knowledge of operations to calculate e.g. - *calculate decimal complements to 10 or 100, such as 100 - 63.8* - *multiply a two-digit number by a single digit e.g. 39 × 7* - *calculate simple fractions or percentages of a number/quantity e.g. ¾ of 400g or 60% of £300* ♦ apply inverse operations ♦ use brackets appropriately, e.g. - *know and use the order of operations, including brackets*	♦ add and subtract negative numbers in context ♦ estimate using approximations ♦ use all four operations with decimals to two places, e.g. - *add and subtract numbers which do not have the same number of decimal places* - *multiply or divide decimal numbers by a single digit e.g. 31.62 × 7* ♦ use a calculator where appropriate to calculate fractions/percentages of quantities/measurements e.g. - *find fractions of quantities such as $^3/_8$ of 980* - *find percentages such as 15% of 360g* ♦ understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three-digit number by any two-digit number	♦ solve simple problems involving ordering, adding, subtracting negative numbers in context ♦ solve simple problems involving ratio and direct proportion, e.g. - *begin to use multiplication rather than trial and improvement to solve ratio problems* ♦ approximate to check answers to problems are of the correct magnitude ♦ check solutions by applying inverse operations or estimating using approximations	♦ construct, express in symbolic form, and use simple formulae involving one or two operations, e.g. - *understand simple expressions using symbols e.g. '2 less than n' can be written as 'n - 2'* - *evaluate expressions by substituting numbers into them* - *use symbols to represent an unknown number or a variable* ♦ use and interpret coordinates in all four quadrants
Level 5	Level 5	Level 5	Level 5	Level 5	Level 5
♦ recognise and describe number patterns, e.g. - *continue sequences involving decimals* ♦ recognise and describe number relationships including multiple, factor and square ♦ use place value to multiply and divide whole numbers by 10 or 100	♦ recognise approximate proportions of a whole and use simple fractions and percentages to describe these - *recognise simple equivalence between fractions, decimals and percentages e.g.$^1/_2$, $^1/_4$, $^1/_{10}$, $^3/_4$* - *convert mixed numbers to improper fractions and vice versa* ♦ order decimals to three decimal places ♦ begin to understand simple ratio	♦ use inverse operations, e.g. - *use a calculator and inverse operations to find missing numbers, including decimals* - *'undo' two-step problems* - *understand 'balancing sums' including those using division, such as 20 + □ = 100 ÷ 4.* ♦ understand the use of brackets in simple calculations ♦ quickly derive division facts that correspond to multiplication facts up to 10 × 10	♦ use a range of mental methods of computation with all operations, e.g. - *calculate complements to 1000.* ♦ recall multiplication facts up to 10 and quickly derive corresponding division facts, e.g. - *use their knowledge of tables and place value in calculations with multiples of 10 such as 30 × 7 , 180 ÷ 3.* ♦ use efficient written methods of addition and subtraction and of short multiplication and division - *calculate 1202 + 45 + 367 or 1025 - 336* - add and subtract decimals to two places ♦ multiply a simple decimal by a single digit - *calculate 36.2 × 8*	♦ solve problems with or without a calculator - *solve two-step problems choosing appropriate operations* - *deal with two constraints simultaneously* - *interpret a calculator display of 4.5 as £4.50 in context of money* - *carry out simple calculations involving negative numbers in context* ♦ check the reasonableness of results with reference to the context or size of numbers	♦ begin to use simple formulae expressed in words ♦ use and interpret coordinates in the first quadrant
Level 4	Level 4	Level 4	Level 4	Level 4	Level 4
Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence

Ma2 overall level Read the complete level descriptions overleaf to confirm the level. Then consider whether the level is low, secure or high

Level 4		
low	secure	high

Level 5		
low	secure	high

Ma2 Number, Level 5

Pupils use their understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000. They order, add and subtract negative numbers in context. They use all four operations with decimals to two places. They reduce a fraction to its simplest form by cancelling common factors and solve simple problems involving ratio and direct proportion. They calculate fractional or percentage parts of quantities and measurements, using a calculator where appropriate. Pupils understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three-digit number by any two-digit number. They check their solutions by applying inverse operations or estimating using approximations. They construct, express in symbolic form, and use simple formulae involving one or two operations. They use brackets appropriately. Pupils use and interpret coordinates in all four quadrants

Ma2 Number, Level 4

Pupils use their understanding of place value to multiply and divide whole numbers by 10 or 100. In solving number problems, pupils use a range of mental methods of computation with the four operations, including mental recall of multiplication facts up to 10×10 and quick derivation of corresponding division facts. They use efficient written methods of addition and subtraction and of short multiplication and division. They add and subtract decimals to two places and order decimals to three places. In solving problems with or without a calculator, pupils check the reasonableness of their results by reference to their knowledge of the context or to the size of the numbers. They recognise approximate proportions of a whole and use simple fractions and percentages to describe these. Pupils recognise and describe number patterns, and relationships including multiple, factor and square. They begin to use simple formulae expressed in words. Pupils use and interpret coordinates in the first quadrant.

	Understanding shapes		Measuring
	Properties of shape	Properties of position and movement	Measures
L5	♦ use a wider range of properties of 2-D and 3-D shapes, e.g. - *understand 'parallel' and begin to understand 'perpendicular' in relation to edges or faces* - *classify quadrilaterals, including trapezium and kite, using their properties e.g. number of parallel sides* - *reason about special triangles and quadrilaterals e.g. given the perimeter and one side of an isosceles triangle, find both possible triangles* - *draw a parallelogram or trapezium of a given area on a square grid* - *given the coordinates of three vertices of a parallelogram, find the fourth* ♦ know and use the angle sum of a triangle and that of angles at a point, e.g. - *calculate 'missing angles' in triangles, including isosceles triangles or right angled triangles, when only one/one other angle is given* - *calculate angles on a straight line or at a point such as the angle between the hands of a clock, or intersecting diagonals at the centre of a regular hexagon* Level 5 ☐	♦ identify all the symmetries of 2-D shapes (for rotation symmetry see key stage 3 programme of study) - *find lines of reflection symmetry in shapes and diagrams* - *recognise order of rotation symmetry* ♦ transform shapes - *reflect shapes in oblique (45°) mirror lines where the shape either does not touch the mirror line, or where the shape crosses the mirror line* - *reflect shapes not presented on grids, by measuring perpendicular distances to/from the mirror* - *reflect shapes in two mirror lines, where the shape is not parallel or perpendicular to either mirror* - *rotate shapes, through 90° or 180°, when the centre of rotation is a vertex of the shape and recognise such rotations* - *translate shapes along an oblique line* ♦ reason about shapes, positions and movements - *visualise a 3-D shape from its net and match vertices that will be joined* - *visualise where patterns drawn on a 3-D shape will occur on its net e.g. when shown a cube with patterns drawn on two or three faces, create the net to make the cube* - *draw shapes with a fixed number of lines of symmetry* Level 5 ☐	♦ measure and draw angles to the nearest degree, when constructing models and drawing or using shapes, e.g. - *measure and draw reflex angles to the nearest degree, when neither edge is horizontal / vertical* - *construct a triangle given the length of two sides and the angle between them (accurate to 1mm and 2°)* ♦ use language associated with angle ♦ read and interpret scales on a range of measuring instruments, explaining what each labelled division represents ♦ solve problems involving the conversion of units e.g. - *solve problems such as 1.5kg ÷ 30g* - *work out approximately how many km are equivalent to 20 miles* ♦ make sensible estimates of a range of measures in relation to everyday situations ♦ understand and use the formula for the area of a rectangle and distinguish area from perimeter - *find the length of a rectangle given its perimeter and width* - *find the area or perimeter of simple L shapes, given some edge lengths* Level 5 ☐
L4	♦ use the properties of 2-D and 3-D shapes, e.g. - *recognise and name most quadrilaterals e.g. trapezium, parallelogram, rhombus* - *recognise right-angled, equilateral, isosceles and scalene triangles* - *recognise an oblique line of symmetry in a shape* - *use mathematical terms such as horizontal, vertical, congruent (same size, same shape)* - *understand properties of shapes, e.g. why a square is a special rectangle* - *visualise shapes and recognise them in different orientations* ♦ make 3-D models by linking given faces or edges Level 4 ☐	♦ draw common 2-D shapes in different orientations on grids, e.g. - *complete a rectangle which has 2 sides drawn at an oblique angle to the grid* ♦ reflect simple shapes in a mirror line, e.g. - *use a grid to plot the reflection in a mirror line presented at 45° where the shape touches the line or not* - *begin to use the distance of vertices from the mirror line to reflect shapes more accurately* ♦ begin to rotate a simple shape or object about its centre or a vertex ♦ translate shapes horizontally <u>or</u> vertically Level 4 ☐	♦ choose and use appropriate units and instruments ♦ interpret, with appropriate accuracy, numbers on a range of measuring instruments, e.g. - *measure a length using mm, to within 2mm* - *measure and drawn acute and obtuse angles to the nearest 5°, when one edge is horizontal /vertical* ♦ find perimeters of simple shapes and find areas by counting squares, e.g. - *use the terms area and perimeter accurately and consistently* - *find areas by counting squares and part squares* - *begin to find the area of shapes that need to be divided into rectangles* - *use 'number of squares in a row times number of rows' to find the area of a rectangle* ♦ use units of time, e.g. - *calculate time durations that go over the hour.* - *read and interpret timetables.* Level 4 ☐
	Insufficient evidence ☐	Insufficient evidence ☐	Insufficient evidence ☐

Ma3 overall level

Read the complete level descriptions overleaf to confirm the level. Then consider whether the level is low, secure or high

Level 4				Level 5		
low	secure	high		low	secure	high

Ma3 Shape, space and measures, Level 5
When constructing models and when drawing or using shapes, pupils measure and draw angles to the nearest degree, and use language associated with angle. Pupils know the angle sum of a triangle and that of angles at a point. They identify all the symmetries of 2-D shapes. They know the rough metric equivalents of imperial units still in daily use and convert one metric unit to another. They make sensible estimates of a range of measures in relation to everyday situations. Pupils understand and use the formula for the area of a rectangle

Ma3 Shape, space and measures, Level 4
Pupils make 3-D mathematical models by linking given faces or edges, draw common 2-D shapes in different orientations on grids. They reflect simple shapes in a mirror line. They choose and use appropriate units and instruments, interpreting, with appropriate accuracy, numbers on a range of measuring instruments. They find perimeters of simple shapes and find areas by counting squares.

	Handling data and Using and applying mathematics		
	Specifying the problem and planning, collecting data	Processing and representing data	Interpreting data
L5	♦ ask questions, plan how to answer them and collect the data required ♦ in probability, select methods based on equally likely outcomes and experimental evidence, as appropriate - *decide if a probability can be calculated or if it can only be estimated from the results of an experiment* ♦ understand that different outcomes may result from repeating an experiment	♦ understand and use the mean of discrete data e.g. - *use the mean of a set of measurements from a science experiment* ♦ understand and use the probability scale from 0 to 1 (from the key stage 3 programme of study) ♦ use methods based on equally likely outcomes and experimental evidence, as appropriate, to find and justify probabilities, and approximations to these (from the key stage 3 programme of study) e.g. - *compare two spinners e.g. to find which is more likely to result in an even number* ♦ create and interpret line graphs where the intermediate values have meaning e.g. - *draw and use a conversion graph for pounds and Euros*	♦ compare two simple distributions, using the range and one of mode, median or mean (mean and median are drawn from the key stage 3 programme of study) - *describe and compare two sets of football results, by using the range and mode* - *solve problems such as, 'Find 5 numbers where the mode is 6 and the range is 8'* ♦ interpret graphs and diagrams, including pie charts, and draw conclusions - *complete a 2-way table, given some of the data* - *interpret bar graphs with grouped data* - *interpret and compare pie charts where it is not necessary to measure angles* - *read between labelled divisions on a scale, for example read 34 on a scale labelled in tens or 3.7 on a scale labelled in ones, and find differences to answer, 'How much more…?'* - *recognise the difference between discrete and continuous data* - *recognise when information is presented in a misleading way, for example compare two pie charts where the sample sizes are different* - *when drawing conclusions, identify further questions to ask* - *describe and predict outcomes from data using the language of chance or likelihood*
	Level 5	Level 5	Level 5
L4	♦ collect discrete data, e.g. - *given a problem, suggest possible answers and data to collect* - *test a hypothesis about the frequency of an event by collecting data, for example collect dice scores to test ideas about how many scores of 6 will occur during 50 throws of a dice* ♦ group data, where appropriate, in equal class intervals, e.g. - *decide on a suitable class interval when collecting or representing data about pupils' hours per week spent watching television* ♦ record discrete data using a frequency table	♦ represent collected data in frequency diagrams, e.g. - *suggest an appropriate frequency diagram to represent particular data, for example decide whether a bar chart, Venn diagram or pictogram would be most appropriately and for pictograms use one symbol to represent, e.g. 2, 5, 10 or 100* ♦ construct simple line graphs - *decide upon an appropriate scale for a graph e.g. labelled divisions representing 2, 5, 10, 100* ♦ continue to use Venn and Carroll diagrams to record their sorting and classifying of information, e.g. - *represent sorting using two criteria typical of level 3 and 4 mathematics such as sorting numbers using properties 'multiples of 8' and 'multiples of 6'*	♦ understand and use the mode and range to describe sets of data - *use mode and range to describe data relating to shoe sizes in their class and begin to compare their data with data from another class* ♦ interpret frequency diagrams and simple line graphs. - *interpret simple pie charts* - *interpret the scale on bar graphs and line graphs, reading between the labelled divisions e.g. reading 17 on a scale labelled in fives* - *interpret the total amount of data represented* - *compare data sets and respond to questions e.g. how does our data about favourite televisions programmes compare to the data from year 3 children?* - *in the context of data relating to everyday situations, understand the language of probability such as 'more likely, equally likely, fair, unfair, certain'*
	Level 4	Level 4	Level 4
	Insufficient evidence	Insufficient evidence	Insufficient evidence

Ma4 overall level

Read the complete level descriptions overleaf to confirm the level. Then consider whether the level is low, secure or high

Level 4				Level 5		
low	secure	high		low	secure	high

Ma2 Handling data, Level 5
Pupils understand and use the mean of discrete data. They compare two simple distributions, using the range and one of mode, median or mean. They interpret graphs and diagrams, including pie charts, and draw conclusions. They understand and use the probability scale from 0 to 1. Pupils find and justify probabilities, and approximations to these, by selecting and using methods based on equally likely outcomes and experimental evidence, as appropriate. They understand that different outcomes may result from repeating an experiment

Ma2 Handling data, Level 4
Pupils collect discrete data and record them using a frequency table. They understand and use the mode and range to describe sets of data. They group data, where appropriate, in equal class intervals, represent collected data in frequency diagrams and interpret such diagrams. They construct and interpret simple line graphs.