



# Assessing pupils' progress in mathematics at Key Stage 3: Assessment guidelines



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Mathematics assessment guide lines: levels 2 and 3

Pupil name ..... Class/group ..... Date .....

	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measure	Handling data
<b>Level 3</b>	<ul style="list-style-type: none"> <li>select the mathematics they use in a wider range of classroom activities</li> <li>try different approaches and find ways of overcoming difficulties that arise when they are solving problems</li> <li>begin to organise their work and check results</li> <li>use and interpret mathematical symbols and diagrams</li> <li>understand a general statement by finding particular examples that match it</li> <li>review their work and reasoning</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>understand place value in numbers to 1000</li> <li>use place value to make approximations</li> <li>recognise negative numbers in contexts such as temperature</li> <li>use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent</li> <li>begin to use decimal notation in contexts such as money</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>derive associated division facts from known multiplication facts</li> <li>add and subtract two-digit numbers mentally</li> <li>add and subtract three digit numbers using written method</li> <li>multiply and divide two digit numbers by 2, 3, 4 or 5 as well as 10 with whole number answers and remainders</li> <li>use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers</li> <li>solve whole number problems including those involving multiplication or division that may give rise to remainders</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>recognise a wider range of sequences</li> <li>begin to understand the role of '=' (the 'equals' sign)</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes</li> <li>begin to recognise nets of familiar 3-D shapes, e.g. cube, cuboid, triangular prism, square-based pyramid</li> <li>recognise shapes in different orientations and reflect shapes, presented on a grid, in a vertical or horizontal mirror line</li> <li>describe position and movement</li> <li>use a wider range of measures including non-standard units and standard metric units of length, capacity and mass in a range of contexts</li> <li>use standard units of time</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>gather information</li> <li>construct bar charts and pictograms, where the symbol represents a group of units</li> <li>use Venn and Carroll diagrams to record their sorting and classifying of information</li> <li>extract and interpret information presented in simple tables, lists, bar charts and pictograms</li> </ul> <input type="checkbox"/>
<b>Level 2</b>	<ul style="list-style-type: none"> <li>select the mathematics they use in some classroom activities</li> <li>discuss their work using mathematical language</li> <li>begin to represent their work using symbols and simple diagrams</li> <li>predict what comes next in a simple number, shape or spatial pattern or sequence and give reasons for their opinions</li> <li>explain why an answer is correct</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>count sets of objects reliably</li> <li>begin to understand the place value of each digit; use this to order numbers up to 100</li> <li>begin to use halves and quarters and relate the concept of half of a small quantity to the concept of half of a shape</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>use the knowledge that subtraction is the inverse of addition and understand halving as a way of 'undoing' doubling and vice versa</li> <li>use mental recall of addition and subtraction facts to 10</li> <li>use mental calculation strategies to solve number problems including those involving money and measures</li> <li>record their work in writing</li> <li>choose the appropriate operation when solving addition and subtraction problems</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>recognise sequences of numbers, including odd and even numbers</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>use mathematical names for common 3-D and 2-D shapes</li> <li>describe their properties, including numbers of sides and corners</li> <li>describe the position of objects</li> <li>distinguish between straight and turning movements; recognise right angles in turns and understand angle as a measurement of turn</li> <li>begin to use a wider range of measures including to use everyday non-standard and standard units to measure length and mass</li> <li>begin to understand that numbers can be used not only to count discrete objects but also to describe continuous measures</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>sort objects and classify them using more than one criterion</li> <li>understand vocabulary relating to handling data</li> <li>collect and sort data to test a simple hypothesis</li> <li>record results in simple lists, tables, pictograms and block graphs</li> <li>communicate their findings, using the simple lists, tables, pictograms and block graphs they have recorded</li> </ul> <input type="checkbox"/>
<b>BL</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>IE</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key: BL-Below Level IE-Insufficient Evidence

Overall assessment (tick one box only)

Low 2

Secure 2

High 2

Low 3

Secure 3

High 3

Mathematics assessment guidelines: levels 3 and 4

Pupil name.....Class/group.....Date.....

	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measures	Handling data
<b>Level 4</b>	<ul style="list-style-type: none"> <li>develop own strategies for solving problems</li> <li>use their own strategies within mathematics and in applying mathematics to practical contexts</li> <li>present information and results in a clear and organised way</li> <li>search for a solution by trying out ideas of their own</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>recognise and describe number patterns</li> <li>recognise and describe number relationships including multiple, factor and square</li> <li>use place value to multiply and divide whole numbers by 10 or 100</li> <li>recognise approximate proportions of a whole and use simple fractions and percentages to describe these</li> <li>order decimals to three decimal places</li> <li>begin to understand simple ratio</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>use a range of mental methods of computation with all operations</li> <li>recall multiplication facts up to 10 x 10 and quickly derive corresponding division facts</li> <li>use efficient written methods of addition and subtraction and of short multiplication and division</li> <li>multiply a simple decimal by a single digit</li> <li>solve problems with or without a calculator</li> <li>check the reasonableness of results with reference to the context or size of numbers</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>begin to use simple formulae expressed in words</li> <li>use and interpret coordinates in the first quadrant</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>use the properties of 2-D and 3-D shapes</li> <li>make 3-D models by linking given faces or edges and draw common 2-D shapes in different orientations on grids</li> <li>reflect simple shapes in a mirror line, translate shapes horizontally or vertically and begin to rotate a simple shape or object about its centre or a vertex</li> <li>choose and use appropriate units and instruments</li> <li>interpret, with appropriate accuracy, numbers on a range of measuring instruments</li> <li>find perimeters of simple shapes and find areas by counting squares</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>collect and record discrete data</li> <li>group data, where appropriate, in equal class intervals</li> <li>continue to use Venn and Carroll diagrams to record their sorting and classifying of information</li> <li>construct and interpret frequency diagrams and simple line graphs</li> <li>understand and use the mode and range to describe sets of data</li> </ul> <input type="checkbox"/>
<b>Level 3</b>	<ul style="list-style-type: none"> <li>select the mathematics they use in a wider range of classroom activities</li> <li>try different approaches and find ways of overcoming difficulties that arise when they are solving problems</li> <li>begin to organise their work and check results</li> <li>use and interpret mathematical symbols and diagrams</li> <li>understand a general statement by finding particular examples that match it</li> <li>review their work and reasoning</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>understand place value in numbers to 1000</li> <li>use place value to make approximations</li> <li>recognise negative numbers in contexts such as temperature</li> <li>use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent</li> <li>begin to use decimal notation in contexts such as money</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>derive associated division facts from known multiplication facts</li> <li>add and subtract two-digit numbers mentally</li> <li>add and subtract three-digit numbers using written method</li> <li>multiply and divide two-digit numbers by 2, 3, 4 or 5 as well as 10 with whole number answers and remainders</li> <li>use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers</li> <li>solve whole number problems including those involving multiplication or division that may give rise to remainders</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>recognise a wider range of sequences</li> <li>begin to understand the role of '=' (the 'equals' sign)</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes</li> <li>begin to recognise nets of familiar 3-D shapes, e.g. cube, cuboid, triangular prism, square-based pyramid</li> <li>recognise shapes in different orientations and reflect shapes, presented on a grid, in a vertical or horizontal mirror line</li> <li>describe position and movement</li> <li>use a wider range of measures including non-standard units and standard metric units of length, capacity and mass in a range of contexts</li> <li>use standard units of time</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>gather information</li> <li>construct bar charts and pictograms, where the symbol represents a group of units</li> <li>use Venn and Carroll diagrams to record their sorting and classifying of information</li> <li>extract and interpret information presented in simple tables, lists, bar charts and pictograms</li> </ul> <input type="checkbox"/>
<b>BL</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>IE</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key: BL-Below Level IE-Insufficient Evidence

Overall assessment (tick one box only)

Low 3  Low 4  High 3  High 4  Secure 3  Secure 4

Mathematics assessment guidelines: levels 4 and 5

Pupil name.....Class/group.....Date.....

	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measure	Handling data
<b>Level 5</b>	<ul style="list-style-type: none"> <li>identify and obtain necessary information to carry through a task and solve mathematical problems</li> <li>check results, considering whether these are reasonable</li> <li>solve word problems and investigations from a range of contexts</li> <li>show understanding of situations by describing them mathematically using symbols, words and diagrams</li> <li>draw simple conclusions of their own and give an explanation of their reasoning</li> </ul>	<ul style="list-style-type: none"> <li>use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect</li> <li>round decimals to the nearest decimal place and order negative numbers in context</li> <li>recognise and use number patterns and relationships</li> <li>use equivalence between fractions and order fractions and decimals</li> <li>reduce a fraction to its simplest form by cancelling common factors</li> <li>understand simple ratio</li> </ul>	<ul style="list-style-type: none"> <li>use known facts, place value, knowledge of operations and brackets to calculate including using all four operations with decimals to two places</li> <li>use a calculator where appropriate to calculate fractions/percentages of quantities/measurements</li> <li>non-calculator method for solving problems that involve multiplying and dividing any three-digit number by any two-digit number</li> <li>solve simple problems involving ordering, adding, subtracting negative numbers in context</li> <li>solve simple problems involving ratio and direct proportion</li> <li>apply inverse operations and approximate to check answers to problems are of the correct magnitude</li> </ul>	<ul style="list-style-type: none"> <li>construct, express in symbolic form, and use simple formulae involving one or two operations</li> <li>use and interpret coordinates in all four quadrants</li> </ul>	<ul style="list-style-type: none"> <li>use a wider range of properties of 2-D and 3-D shapes and identify all the symmetries of 2-D shapes</li> <li>use language associated with angle and know and use the angle sum of a triangle and that of angles at a point</li> <li>reason about position and movement and transform shapes</li> <li>measure and draw angles to the nearest degree, when constructing models and drawing or using shapes</li> <li>read and interpret scales on a range of measuring instruments, explaining what each labelled division represents</li> <li>solve problems involving the conversion of units and make sensible estimates of a range of measures in relation to everyday situations</li> <li>understand and use the formula for the area of a rectangle and distinguish area from perimeter</li> </ul>	<ul style="list-style-type: none"> <li>ask questions, plan how to answer them and collect the data required</li> <li>in probability, select methods based on equally likely outcomes and experimental evidence, as appropriate</li> <li>understand and use the probability scale from 0 to 1</li> <li>understand and use the mean of discrete data and compare two simple distributions, using the range and one of mode, median or mean</li> <li>understand that different outcomes may result from repeating an experiment</li> <li>interpret graphs and diagrams, including pie charts, and draw conclusions</li> <li>create and interpret line graphs where the intermediate values have meaning</li> </ul>
<b>Level 4</b>	<ul style="list-style-type: none"> <li>develop own strategies for solving problems</li> <li>use their own strategies within mathematics and in applying mathematics to practical contexts</li> <li>present information and results in a clear and organised way</li> <li>search for a solution by trying out ideas of their own</li> </ul>	<ul style="list-style-type: none"> <li>recognise and describe number patterns</li> <li>recognise and describe number relationships including multiple, factor and square</li> <li>use place value to multiply and divide whole numbers by 10 or 100</li> <li>recognise approximate proportions of a whole and use simple fractions and percentages to describe these</li> <li>order decimals to three decimal places</li> <li>begin to understand simple ratio</li> </ul>	<ul style="list-style-type: none"> <li>use a range of mental methods of computation with all operations</li> <li>recall multiplication facts up to 10 x 10 and quickly derive corresponding division facts</li> <li>use efficient written methods of addition and subtraction and of short multiplication and division</li> <li>multiply a simple decimal by a single digit</li> <li>solve problems with or without a calculator</li> <li>check the reasonableness of results with reference to the context or size of numbers</li> </ul>	<ul style="list-style-type: none"> <li>begin to use simple formulae expressed in words</li> <li>use and interpret coordinates in the first quadrant</li> </ul>	<ul style="list-style-type: none"> <li>use the properties of 2-D and 3-D shapes</li> <li>make 3-D models by linking given faces or edges and draw common 2-D shapes in different orientations on grids</li> <li>reflect simple shapes in a mirror line, and begin to rotate a simple shape or object about its centre or a vertex</li> <li>choose and use appropriate units and instruments</li> <li>interpret, with appropriate accuracy, numbers on a range of measuring instruments</li> <li>find perimeters of simple shapes and find areas by counting squares</li> </ul>	<ul style="list-style-type: none"> <li>collect and record discrete data group data, where appropriate, in equal class intervals</li> <li>continue to use Venn and Carroll diagrams to record their sorting and classifying of information</li> <li>construct and interpret frequency diagrams and simple line graphs</li> <li>understand and use the mode and range to describe sets of data</li> </ul>
<b>BL</b>						
<b>IE</b>						

Key: BL-Below Level IE-Insufficient Evidence

Overall assessment (tick one box only)

Low 4

Secure 4

High 4

Low 5

Secure 5

High 5



	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measure	Handling data
<b>Level 6</b>	<ul style="list-style-type: none"> <li>solve problems and carry through substantial tasks by breaking them into smaller, more manageable tasks, using a range of efficient techniques, methods and resources, including ICT; give solutions to an appropriate degree of accuracy</li> <li>interpret, discuss and synthesise information presented in a variety of mathematical forms</li> <li>present a concise, reasoned argument, using symbols, diagrams, graphs and related explanatory texts</li> <li>use logical argument to establish the truth of a statement</li> </ul>	<ul style="list-style-type: none"> <li>use the equivalence of fractions, decimals and percentages to compare proportions</li> </ul>	<ul style="list-style-type: none"> <li>calculate percentages and find the outcome of a given percentage increase or decrease</li> <li>divide a quantity into two or more parts in a given ratio and solve problems involving ratio and direct proportion</li> <li>use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole</li> <li>add and subtract fractions by writing them with a common denominator, calculate fractions of quantities (fraction answers), multiply and divide an integer by a fraction</li> </ul>	<ul style="list-style-type: none"> <li>use systematic trial and improvement methods and ICT tools to find approximate solutions to equations such as <math>x^2 + x = 20</math></li> <li>construct and solve linear equations with integer coefficients, using an appropriate method</li> <li>generate terms of a sequence using term-to-term and position-to-term definitions of the sequence, on paper and using ICT; write an expression to describe the nth term of an arithmetic sequence.</li> <li>plot the graphs of linear functions, where y is given explicitly in terms of x; recognise that equations of the form <math>y = mx + c</math> correspond to straight-line graphs</li> <li>construct functions arising from real-life problems and plot their corresponding graphs;</li> <li>interpret graphs arising from real situations</li> </ul>	<ul style="list-style-type: none"> <li>classify quadrilaterals by their geometric properties</li> <li>solve geometrical problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons</li> <li>identify alternate and corresponding angles; understand a proof that the sum of the angles of a triangle is 180° and of a quadrilateral is 360°</li> <li>devise instructions for a computer to generate and transform shapes and paths visualise and use 2-D representations of 3-D objects</li> <li>enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor</li> <li>know that translations, rotations and reflections preserve length and angle and map objects onto congruent images</li> <li>use straight edge and compasses to do standard constructions</li> <li>deduce and use formulae for the area of a triangle and parallelogram, and the volume of a cuboid; calculate volumes and surface areas of cuboids</li> <li>know and use the formulae for the circumference and area of a circle</li> </ul>	<ul style="list-style-type: none"> <li>design a survey or experiment to capture the necessary data from one or more sources; design, trial and, if necessary, refine data collection sheets; construct tables for large discrete and continuous sets of raw data, choosing suitable class intervals; design and use two-way tables</li> <li>select, construct and modify, on paper and using ICT:             <ul style="list-style-type: none"> <li>pie charts for categorical data</li> <li>bar charts and frequency diagrams for discrete and continuous data</li> <li>simple time graphs for time series</li> <li>scatter graphs</li> </ul> </li> <li>and identify which are most useful in the context of the problem</li> <li>find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way</li> <li>know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems</li> <li>communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support</li> </ul>
<b>Level 5</b>	<ul style="list-style-type: none"> <li>identify and obtain necessary information to carry through a task and solve mathematical problems</li> <li>check results, considering whether these are reasonable</li> <li>solve word problems and investigations from a range of contexts</li> <li>show understanding of situations by describing them mathematically using symbols, words and diagrams</li> <li>draw simple conclusions of their own and give an explanation of their reasoning</li> </ul>	<ul style="list-style-type: none"> <li>use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect</li> <li>round decimals to the nearest decimal place and order negative numbers in context</li> <li>recognise and use number patterns and relationships</li> <li>use equivalence between fractions and order fractions and decimals</li> <li>reduce a fraction to its simplest form by cancelling common factors</li> <li>understand simple ratio</li> </ul>	<ul style="list-style-type: none"> <li>use known facts, place value, knowledge of operations and brackets to calculate including using all four operations with decimals to two places</li> <li>use a calculator where appropriate to calculate fractions/percentages of quantities/measurements</li> <li>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</li> <li>solve simple problems involving ordering, adding, subtracting negative numbers in context</li> <li>solve simple problems involving ratio and direct proportion</li> <li>apply inverse operations and approximate to check answers to problems are of the correct magnitude</li> </ul>	<ul style="list-style-type: none"> <li>construct, express in symbolic form, and use simple formulae involving one or two operations</li> <li>use and interpret coordinates in all four quadrants</li> </ul>	<ul style="list-style-type: none"> <li>use a wider range of properties of 2-D and 3-D shapes and identify all the symmetries of 2-D shapes</li> <li>use language associated with angle and know and use the angle sum of a triangle and that of angles at a point</li> <li>reason about position and movement and transform shapes</li> <li>measure and draw angles to the nearest degree, when constructing models and drawing or using shapes</li> <li>read and interpret scales on a range of measuring instruments, explaining what each labelled division represents</li> <li>solve problems involving the conversion of units and make sensible estimates of a range of measures in relation to everyday situations</li> <li>understand and use the formulae for the area of a rectangle and distinguish area from perimeter</li> </ul>	<ul style="list-style-type: none"> <li>ask questions, plan how to answer them and collect the data required</li> <li>in probability, select methods based on equally likely outcomes and experimental evidence, as appropriate</li> <li>understand and use the probability scale from 0 to 1</li> <li>understand and use the mean of discrete data and compare two simple distributions, using the range and one of mode, median or mean</li> <li>understand that different outcomes may result from repeating an experiment</li> <li>interpret graphs and diagrams, including pie charts, and draw conclusions</li> <li>create and interpret line graphs where the intermediate values have meaning</li> </ul>
<b>BL</b>						
<b>IE</b>						

Key: BL-Below Level IE-Insufficient Evidence

Overall assessment (tick one box only)

Low 5

Secure 5

High 5

Low 6

Secure 6

High 6

	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measure	Handling data
<b>Level 7</b>	<ul style="list-style-type: none"> <li>solve increasingly demanding problems and evaluate solutions; explore connections in mathematics across a range of contexts: number, algebra, shape, space and measures, and handling data; refine or extend the mathematics used to generate fuller solutions</li> <li>give reasons for choice of presentation, explaining selected features and showing insight into the problems structure</li> <li>justify generalisations, arguments or solutions</li> <li>appreciate the difference between mathematical explanation and experimental evidence</li> </ul>	<ul style="list-style-type: none"> <li>understand and use proportionality</li> </ul>	<ul style="list-style-type: none"> <li>calculate the result of any proportional change using multiplicative methods</li> <li>understand the effects of multiplying and dividing by numbers between 0 and 1, add, subtract, multiply and divide fractions</li> <li>make and justify estimates and approximations of calculations; estimate numbers to one significant figure and multiplying and dividing mentally</li> <li>use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation</li> </ul>	<ul style="list-style-type: none"> <li>square a linear expression, and expand and simplify the product of two linear expressions of the form <math>(x \pm n)</math> and simplify the corresponding quadratic expression</li> <li>use algebraic and graphical methods to solve simultaneous linear equations in two variables</li> <li>solve inequalities in one variable and represent the solution set on a number line</li> <li>use formulae from mathematics and other subjects; substitute numbers into expressions and formulae; derive a formula and, in simple cases, change its subject</li> <li>find the next term and nth term of quadratic sequences and functions and explore their properties</li> <li>plot graphs of simple quadratic and cubic functions, e.g. <math>y = x^2</math>; <math>y = 3x^2 + 4</math>; <math>y = x^3</math></li> </ul>	<ul style="list-style-type: none"> <li>understand and apply Pythagoras' theorem when solving problems in 2-D</li> <li>calculate lengths, areas and volumes in plane shapes and right prisms</li> <li>enlarge 2-D shapes, given a centre of enlargement and a fractional scale factor, on paper and using ICT; recognise the similarity of the resulting shapes</li> <li>find the locus of a point that moves according to a given rule, both by reasoning and using ICT</li> <li>recognise that measurements given to the nearest whole unit may be inaccurate by up to one-half of the unit in either direction</li> <li>understand and use measures of speed (and other compound measures such as density or pressure) to solve problems</li> </ul>	<ul style="list-style-type: none"> <li>suggest a problem to explore using statistical methods, frame questions and raise conjectures; identify possible sources of bias and plan how to minimise it</li> <li>select, construct and modify, on paper and using ICT suitable graphical representation to progress an enquiry including frequency polygons and lines of best fit on scatter graphs</li> <li>estimate the mean, median and range of a set of grouped data and determine the modal class, selecting the statistic most appropriate to the line of enquiry</li> <li>compare two or more distributions and make inferences, using the shape of the distributions and measures of average and range</li> <li>understand relative frequency as an estimate of probability and use this to compare outcomes of an experiment</li> <li>examine critically the results of a statistical enquiry, and justify the choice of statistical representation in written presentation</li> </ul>
<b>Level 6</b>	<ul style="list-style-type: none"> <li>solve problems and carry through substantial tasks by breaking them into smaller, more manageable tasks, using a range of efficient techniques, methods and resources, including ICT; give solutions to an appropriate degree of accuracy</li> <li>interpret, discuss and synthesise information presented in a variety of mathematical forms</li> <li>present a concise, reasoned argument, using symbols, diagrams, graphs and related explanatory texts</li> <li>use logical argument to establish the truth of a statement</li> </ul>	<ul style="list-style-type: none"> <li>use the equivalence of fractions, decimals and percentages to compare proportions</li> </ul>	<ul style="list-style-type: none"> <li>calculate percentages and find the outcome of a given percentage increase or decrease</li> <li>divide a quantity into two or more parts in a given ratio and solve problems involving ratio and direct proportion</li> <li>use proportional reasoning to solve a problem, choosing the correct numbers to take as 100%, or as a whole</li> <li>add and subtract fractions by writing them with a common denominator, calculate fractions of quantities (fraction answers), multiply and divide an integer by a fraction</li> </ul>	<ul style="list-style-type: none"> <li>use systematic trial and improvement methods and ICT tools to find approximate solutions to equations such as <math>x^2 + x = 20</math></li> <li>construct and solve linear equations with integer coefficients, using an appropriate method</li> <li>generate terms of a sequence using term-to-term and position-to-term definitions of the sequence, on paper and using ICT; write an expression to describe the nth term of an arithmetic sequence.</li> <li>plot the graphs of linear functions, where y is given explicitly in terms of x; recognise that equations of the form <math>y = mx + c</math> correspond to straight-line graphs</li> <li>construct functions arising from real-life problems and plot their corresponding graphs;</li> <li>interpret graphs arising from real situations</li> </ul>	<ul style="list-style-type: none"> <li>classify quadrilaterals by their geometric properties</li> <li>solve geometrical problems using properties of angles, of parallel and intersecting lines, and of triangles and other polygons</li> <li>identify alternate and corresponding angles; understand a proof that the sum of the angles of a triangle is <math>180^\circ</math> and of a quadrilateral is <math>360^\circ</math></li> <li>devise instructions for a computer to generate and transform shapes and paths</li> <li>visualise and use 2-D representations of 3-D objects</li> <li>enlarge 2-D shapes, given a centre of enlargement and a positive whole-number scale factor</li> <li>know that translations, rotations and reflections preserve length and angle and map objects onto congruent images</li> <li>use straight edge and compasses to do standard constructions</li> <li>deduce and use formulae for the area of a triangle and parallelogram, and the volume of a cuboid; calculate volumes and surface areas of cuboids</li> <li>know and use the formulae for the circumference and area of a circle</li> </ul>	<ul style="list-style-type: none"> <li>design a survey or experiment to capture the necessary data from one or more sources; design, trial and, if necessary, refine data collection sheets; construct tables for large discrete and continuous sets of raw data, choosing suitable class intervals; design and use two-way tables</li> <li>select, construct and modify, on paper and using ICT: <ul style="list-style-type: none"> <li>pie charts for categorical data</li> <li>bar charts and frequency diagrams for discrete and continuous data</li> <li>simple time graphs for time series</li> <li>scatter graphs</li> </ul> </li> <li>and identify which are most useful in the context of the problem</li> <li>find and record all possible mutually exclusive outcomes for single events and two successive events in a systematic way</li> <li>know that the sum of probabilities of all mutually exclusive outcomes is 1 and use this when solving problems</li> <li>communicate interpretations and results of a statistical survey using selected tables, graphs and diagrams in support</li> </ul>
<b>BL</b>						
<b>IE</b>						

Key: BL-Below level IE-Insufficient evidence

Overall assessment (tick one box only)

Low 6

Secure 6

High 6

Low 7

Secure 7

High 7



	Using and applying mathematics	Numbers and the number system	Calculating	Algebra	Shape, space and measure	Handling data
<b>Level 8</b>	<ul style="list-style-type: none"> <li>develop and follow alternative methods and approaches</li> <li>reflect on lines of enquiry when exploring mathematical tasks</li> <li>select and combine known facts and problem-solving strategies to solve problems of increasing complexity</li> <li>convey mathematical meaning through precise and consistent use of symbols</li> <li>examine generalisations or solutions reached in an activity, commenting constructively on the reasoning and logic or the process employed, or the results obtained</li> <li>distinguish between practical demonstration and proof; know underlying assumptions, recognising their importance and limitations, and the effect of varying them</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>understand the equivalence between recurring decimals and fractions</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>use fractions or percentages to solve problems involving repeated proportional changes or the calculation of the original quantity given the result of a proportional change</li> <li>solve problems involving calculating with powers, roots and numbers expressed in standard form, checking for correct order of magnitude and using a calculator as appropriate</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>factorise quadratic expressions including the difference of two squares, e.g. <math>x^2 - 9 = (x + 3)(x - 3)</math></li> <li>manipulate algebraic formulae, equations and expressions, finding common factors and multiplying two linear expressions</li> <li>derive and use more complex formulae and change the subject of a formula</li> <li>evaluate algebraic formulae, substituting fractions, decimals and negative numbers</li> <li>solve inequalities in two variables and find the solution set</li> <li>sketch, interpret and identify graphs of linear, quadratic, cubic and reciprocal functions, and graphs that model real situations</li> <li>understand the effect on a graph of addition of (or multiplication by) a constant</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>understand and use congruence and mathematical similarity</li> <li>understand and use trigonometrical relationships in right-angled triangles, and use these to solve problems, including those involving bearings</li> <li>understand the difference between formulae for perimeter, area and volume in simple contexts by considering dimensions</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>estimate and find the median, quartiles and interquartile range for large data sets, including using a cumulative frequency diagram</li> <li>compare two or more distributions and make inferences, using the shape of the distributions and measures of average and spread including median and quartiles</li> <li>know when to add or multiply two probabilities</li> <li>use tree diagrams to calculate probabilities of combinations of independent events</li> </ul> <input type="checkbox"/>
<b>Level 7</b>	<ul style="list-style-type: none"> <li>solve increasingly demanding problems and evaluate solutions; explore connections in mathematics across a range of contexts: number, algebra, shape, space and measures, and handling data; refine or extend the mathematics used to generate fuller solutions</li> <li>give reasons for choice of presentation, explaining selected features and showing insight into the problems structure</li> <li>justify generalisations, arguments or solutions</li> <li>appreciate the difference between mathematical explanation and experimental evidence</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>understand and use proportionality</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>calculate the result of any proportional change using multiplicative methods</li> <li>understand the effects of multiplying and dividing by numbers between 0 and 1, add, subtract, multiply and divide fractions</li> <li>make and justify estimates and approximations of calculations; estimate calculations by rounding numbers to one significant figure and multiplying and dividing mentally</li> <li>use a calculator efficiently and appropriately to perform complex calculations with numbers of any size, knowing not to round during intermediate steps of a calculation</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>square a linear expression, and expand and simplify the product of two linear expressions of the form <math>(x \pm n)</math> and simplify the corresponding quadratic expression</li> <li>use algebraic and graphical methods to solve simultaneous linear equations in two variables</li> <li>solve inequalities in one variable and represent the solution set on a number line</li> <li>use formulae from mathematics and other subjects; substitute numbers into expressions and formulae; derive a formula and, in simple cases, change its subject</li> <li>find the next term and nth term of quadratic sequences and functions and explore their properties</li> <li>plot graphs of simple quadratic and cubic functions, e.g. <math>y = x^2</math>; <math>y = 3x^2 + 4</math>; <math>y = x^3</math></li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>Pythagoras' theorem when solving problems in 2-D</li> <li>calculate lengths, areas and volumes in plane shapes and right prisms</li> <li>enlarge 2-D shapes; given a centre of enlargement and a fractional scale factor, on paper and using ICT; recognise the similarity of the resulting shapes</li> <li>find the locus of a point that moves according to a given rule, both by reasoning and using ICT</li> <li>recognise that measurements given to the nearest whole unit may be inaccurate by up to one-half of the unit in either direction</li> <li>understand and use measures of speed (and other compound measures such as density or pressure) to solve problems</li> </ul> <input type="checkbox"/>	<ul style="list-style-type: none"> <li>suggest a problem to explore using statistical methods, frame questions and raise conjectures; identify possible sources of bias and plan how to minimise it</li> <li>select, construct and modify, on paper and using ICT suitable graphical representation to progress an enquiry including frequency polygons and lines of best fit on scatter graphs</li> <li>estimate the mean, median and range of a set of grouped data and determine the modal class, selecting the statistic most appropriate to the line of enquiry</li> <li>compare two or more distributions and make inferences, using the shape of the distributions and measures of average and range</li> <li>understand relative frequency as an estimate of probability and use this to compare outcomes of an experiment</li> <li>examine critically the results of a statistical enquiry and justify the choice of statistical representation in written presentation</li> </ul> <input type="checkbox"/>
<b>BL</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>IE</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Key: BL-Below Level IE-Insufficient Evidence

Overall assessment (tick one box only)

Low 7 Secure 7 High 7 Low 8 Secure 8 High 8

Audience: Secondary subject leaders

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