

Mathematics Sub-Level Document Levels 1-5

Using and applying maths Ma1			
Level	Problem solving	Communicating	Reasoning
1	Use maths as an integral part of classroom activities, e.g. with support - engage with practical mathematical activities involving sorting, counting and measuring by direct comparison. -begin to understand the relevance of mathematical ideas to everyday situations by using them in role-play.	Represent their work with objects or pictures Discuss their work e.g. with support, - respond to questions and ideas from peers and adults - refer to the materials they have used and talk about what they have done, patterns they have noticed, etc.	Draw simple conclusions from their work, e.g. with support - describe the different ways they have sorted objects, what is the same about objects in a set, how sets differ. - identify which set has most, which object is the biggest, smallest, tallest, etc - explain numbers & calculations, how many altogether, how many used or hidden, how many left, how many each, etc Recognize & use simple pattern or relationship eg with support - copy & continue a simple pattern of objects, shapes or numbers

Ma1 Using and applying mathematics, level 1

Pupils use mathematics as an integral part of classroom activities. They represent their work with objects or pictures and discuss it. They recognize and use a simple pattern or relationship.

Number Ma2						
Level	Numbers and the number system	FDPRP	Operations and the relationships between them	Mental methods	Solving numerical problems	Written and calculator methods
1c	Count at least 10 objects with some consistency Reads most numbers up to 10 in familiar contexts. Attempt to record numbers to 10.		In practical activities use the vocabulary involved in adding and taking away	Count on in ones Count back in ones	Begin to recognise and sort coins and use them in role play. Solve problems in a practical or role play context involving numbers to 10.	Begin to record their work using their own mark making.
1b	Count reliably at least 10 objects. Read numbers up to 10 in a range of settings. Write numbers up to 10 with increasing accuracy. Order numbers to 10 on a number track / washing line. Begin to use ordinal numbers. Say what number comes next, is one more /one less. Count back to zero.	Begin to use the fraction, one-half in practical contexts e.g. folding shapes, half fill a container.	Understand addition as finding the total of two or more sets of objects. Understand subtraction as taking away objects from a set and finding how many are left.	Begin to add by counting on. Begin to know some addition facts. Subtract numbers of object to 10.	Solve addition and subtraction problems up to 10 objects practically. Given a number, work out how many more to make ... Solve problems involving 1p and £1.	Record their work e.g. with objects, pictures and diagrams. Begin to use the + and = signs to record additions.
1a	Recognise 0 as none or zero in context. Count and read numbers from 0 to at least 20. Order numbers to at least 20. Begin counting forwards and backwards in twos and tens starting from zero.	Begin to halve an even number of objects	Understand that addition can be done in any order. When comparing 2 sticks of multi-link, work out how many more to make the same.	Begin to count on from the number of objects in a first set to find the total number in 2 sets.	Respond to 'What could we try next?' Find coins to total 10p	Jump in ones in a numbered number line to help solve problems. Use the +/- and = signs to record additions and subtractions

Ma2 Number, Level 1

Pupils count, order, add and subtract numbers when solving problems involving up to 10 objects. They read and write the numbers involved.

Shape, Space and Measures Ma3				Handling Data Ma4	
Level	Shape	Position and movement	Measures	Processing and representing data	Interpreting data
1c	Begin to use everyday language to describe properties of 2D and 3D shapes. Make patterns and pictures with 2D shapes. Construct with 3D shapes.	Begin to use everyday language to describe position E.g. behind, in front of, in the middle on top, between, under, next to.	Measure and order objects using direct comparison. Compare lengths directly and put them in order. Order the days of the week.	Sort and classify objects using 1 criterion. Use a large scale Venn Diagram to sort objects.	Respond to questions about how they have sorted objects and why each object belongs in a set.
1b	Use everyday language to describe properties of familiar 3-D and 2-D shapes. Sort shapes and say how they have been selected. Begin to refer to some features of shapes such as side and corner. Begin to name 2D shapes E.g. circle triangle, square and rectangle. Begin to name 3D shapes E.g. cube cuboid, sphere & cylinder.	Use vocabulary related to position E.g. behind, in front of, in the middle on top, between, under, next to.	Measure and order more than two objects using direct comparison. (Length, mass and capacity) Respond to and use the language of comparison E.g. longer, longest, shorter, shortest, more, less. Begin to put 3 objects in order. Order everyday events and describe the sequence. Begin to read the o'clock on an analogue clock.	Sort and classify objects E.g. sort into hoops according to boy/girl or thick/thin	Talk about which set has most E.g. "Most children stayed at school for lunch".
1a	Begin to refer to some features of shapes such as side and corner.	Respond to and use directional language in talk about objects and movement e.g. forwards, backwards, turn.	Find objects that are longer/shorter than a metre heavier/lighter than 500g, hold more/less than 1 litre. Read the time on an analogue clock at the hour and begin to know the half hour.	Sort objects onto a Carroll diagram. Use the objects they have sorted as a record. Use objects/pictures/themselves to create simple block graphs.	Talk about how they have represented their work.

Ma3 Shape, space and measures, Level 1

When working with 2-D and 3-D shapes, pupils use everyday language to describe properties and positions. They measure and order objects using direct comparison and order events.

Ma4 Handling data, Level 1 (included in programme of study for Ma2 Number in Key Stage 1)

Pupils sort objects and classify them, demonstrating the criterion they have used.

Using and applying maths Ma1			
Level	Problem solving	Communicating	Reasoning
2	<p>select the mathematics they use in some classroom activities, e.g. with support</p> <ul style="list-style-type: none"> - find a starting point, identifying key facts/relevant information - use apparatus, diagrams, role play, etc. to represent and clarify a problem - move between different representations of a problem e.g. a situation described in words, a diagram etc. - adopt a suggested model or systematic approach - make connections and apply their knowledge to similar situations 	<p>discuss their work using mathematical language, e.g. with support</p> <ul style="list-style-type: none"> - describe the strategies and methods they use in their work - listen to others' explanations, try to make sense of them, compare ... evaluate.. - begin to represent their work using symbols and simple diagrams, e.g. with support - use pictures, diagrams and symbols to communicate their thinking, or demonstrate a solution or process 	<p>explain why an answer is correct, e.g. with support</p> <ul style="list-style-type: none"> - test a statement such as 'The number 12 ends with a 2 so 12 sweets can't be shared equally by 3 children' - predict what comes next in a simple number, shape or spatial pattern or sequence and give reasons for their opinions

Ma1 Using and applying mathematics, level 2

Pupils select the mathematics they use in some classroom activities. They discuss their work using some mathematical language and are beginning to represent it using symbols and simple diagrams. They explain why an answer is correct.

Number Ma2						
Level	Numbers and the number system	FDPRP	Operations and the relationships between them	Mental methods	Solving numerical problems	Written and calculator methods
2c	<p>Begin to understand place value.</p> <p>Start to recognise odd and even numbers.</p> <p>Say the number that is ten more / ten less.</p> <p>Begin counting in fives starting from zero.</p>	<p>Begin to use the fraction, one-quarter in practical contexts e.g. folding shapes</p>	<p>Count up to find a difference</p> <p>Begin to understand that shapes and symbols can be used to represent numbers</p> <p>Eg Put numbers in the shapes to add to 12.</p> <p>• + ○ = 12</p>	<p>Begin to know by heart all pairs of numbers with totals up to 10.</p> <p>Use above facts to add or subtract pairs of numbers mentally.</p> <p>Know by heart addition doubles of all numbers to at least 5.</p>	<p>Choose coins to total up to 20p.</p> <p>Use mental strategies to solve simple problems using counting.</p>	<p>Jump in ones and tens on a numbered number line to help solve problems.</p>
2b	<p>Begin to understand the place value of each digit, use this to order numbers to at least 100.</p> <p>Recognise sequences of number including odd and even numbers. Continue a number sequence that increases or decreases in regular steps.</p> <p>Count sets of objects reliably including grouping objects in 10s, 2s, and 5s.</p>	<p>Begin to use halves and quarters in practical situations e.g., sharing sweets between four and getting a quarter each</p> <p>Relate the concept of half of a small quantity to the concept of half of a shape e.g. shade one half or one quarter of a given shape.</p>	<p>Recognise subtraction is the inverse of addition.</p> <p>Use the knowledge of inverses to write related number sentences.</p> <p>e.g. $6 + 8 = 14$ $14 - 8 = 6$ $8 + ? = 14$</p> <p>Begin to understand subtraction as 'difference' and use a number line to record.</p>	<p>Know by heart all addition and subtraction facts for each number to 10.</p> <p>Use mental calculation strategies to solve simple problems using addition, subtraction involving money and measures.</p> <p>Identify doubles and halves of numbers up to 20.</p>	<p>Recognise coins to 50p and choose coins to make amounts up to 50p.</p> <p>Begin to choose the appropriate operation and resources to solve simple problems using addition, subtraction.</p>	<p>Use the symbols + - and = to record number sentences.</p>
2a	<p>Count, read, write and order accurately to at least 100.</p> <p>Explain what each digit represents in any 2 digit number.</p> <p>Describe and extend simple number sequences (including odd/even numbers)</p>	<p>Begin to understand and use unit fractions such as $\frac{1}{2}$ $\frac{1}{4}$ $\frac{1}{3}$ of shapes.</p>	<p>Understand the operation of multiplication as repeated addition.</p> <p>Begin to see multiplication as an array and represent on a number line.</p> <p>Begin to understand division as repeated subtraction or sharing</p> <p>Understand halving as a way of 'undoing' doubling.</p>	<p>Use place value to derive facts such as $30 + 70 = 100$.</p> <p>Know by heart facts for the 2x and 10x tables.</p> <p>Use mental strategies to solve simple problems using +/-, doubling & halving, explaining methods & reasoning orally.</p> <p>Add or subtract mentally a multiple of 10 to/from a 2 digit number.</p>	<p>Choose the appropriate operation when solving addition and subtraction problems.</p> <p>Recognise all coins and choose coins to make amounts up to £1.</p> <p>Recognise equivalent amounts of money.</p>	<p>Record mental calculations as number sentences using + - x ÷ and = symbols.</p> <p>Use £ sign.</p>

Ma2 Number, Level 2

Pupils count sets of objects reliably, and use mental recall of addition and subtraction facts to 10. They begin to understand the place value of each digit in a number and use this to order numbers up to 100. They choose the appropriate operation when solving addition and subtraction problems. They use the knowledge that subtraction is the inverse of addition. They use mental calculation strategies to solve number problems involving money and measures. They recognise sequences of numbers, including odd and even numbers.

Shape, Space and Measures Ma3				Handling Data Ma4	
Level	Shape	Position and movement	Measures	Processing and representing data	Interpreting data
2c	<p>Use mathematical names for common 3-D and 2-D shapes.</p> <p>Talk about number of sides and corners.</p> <p>Begin to link everyday language with mathematical language e.g. angle, point.</p>	<p>Distinguish between straight and turning movements E.g. when instructing a programmable toy combine straight line movements and turns to reach a target.</p> <p>Use ordinal numbers to describe position of objects in a row.</p>	<p>Use non-standard units to measure length and mass and capacity.</p> <p>Tell the time using hours and half-hour.</p> <p>Make whole turns, half turns and quarter turns</p>	<p>Collect data by counting.</p> <p>Record data in a pictogram or block graph.</p>	<p>Communicate findings, using pictograms and block graphs.</p>
2b	<p>Identify 2D and 3D shapes from pictures. e.g. square, triangle, hexagon, pentagon, octagon, cube, cylinder, sphere, cuboid, pyramid.</p> <p>Make and talk about shapes referring to features and properties E.g. edge, face.</p> <p>Visualise frequently used 2-D and 3-D shapes.</p> <p>Sort 2-D and 3-D shapes according to a single criterion e.g. shapes that are pentagons or shapes with a right angle</p>	<p>Recognise a right angle as a quarter turn.</p> <p>Follow & give instructions involving position, direction & movement.</p> <p>Distinguish between left and right.</p>	<p>Begin to use standard units to measure & compare quantities & objects.</p> <p>Tell the time using hours, half-hour & quarter-hours.</p> <p>Know which measuring tools to use e.g. to find how much an object weighs, how tall a child is, how long to run round the playground.</p> <p>Make and use a right angle checker</p>	<p>Understand vocabulary relating to handling data E.g. sort, group, set, list, table, most common, most popular.</p> <p>Organise and classify data using simple lists and tables.</p> <p>Enter data on to a simple computer database.</p>	<p>Communicate their findings, using the simple lists, tables, pictograms and block graphs.</p> <p>Respond to questions about the data they have presented.</p>
2a	<p>Recognise right angles in 2-D shapes.</p> <p>Understand that the properties of shapes remain the same regardless of size and orientation.</p>	<p>Recognise and explain that a shape stays the same even when it is held up in different orientations.</p>	<p>Begin to make sensible estimates in relation to familiar units.</p> <p>Read scales to the nearest labeled division.</p> <p>Order events using a timeline.</p>	<p>Collect and sort data to test a simple hypothesis.</p> <p>Sort objects and classify them using more than one criterion.</p>	<p>Interpret data presented in simple lists, tables, pictograms or block graphs.</p> <p>Pose questions for others about their data</p>

Ma3 Shape, space and measures, level 2

Pupils use mathematical names for common 3-D and 2-D shapes and describe their properties, including numbers of sides and corners. They distinguish between straight and turning movements, understand angle as a measurement of turn, and recognise right angles in turns. They begin to use everyday non-standard and standard units to measure length, mass and capacity.

Ma4 Handling data, level 2 (included in programme of study for Ma2 Number in Key Stage 1)

Pupils sort objects and classify them using more than one criterion. When they have gathered information, pupils record results in simple lists, tables and block graphs, in order to communicate their findings.

Using and applying maths Ma1

Level	Problem solving	Communicating	Reasoning
3	<p>select the mathematics they use in a wider range of classroom activities, e.g.</p> <ul style="list-style-type: none"> - use classroom discussions to break into a problem, recognising similarities to previous work - put the problem into their own words - use mathematical content from levels 2 and 3 - choose their own equipment appropriate to the task, including calculators. <p>try different approaches and find ways of overcoming difficulties that arise when they are solving problems, e.g.</p> <ul style="list-style-type: none"> - check their work and make appropriate corrections, e.g. decide that two numbers less than 100 cannot give a total more than 200 and correct the addition - begin to look for patterns in results as they work 	<p>begin to organise their work and check results, e.g. begin to develop own ways of recording develop an organised approach as they get into recording their work on a problem</p> <p>discuss their mathematical work and begin to explain their thinking, e.g. use appropriate mathematical vocabulary talk about their findings by referring to their written work.</p> <p>use and interpret mathematical symbols and diagrams</p>	<p>understand a general statement by finding particular examples that match it, e.g.</p> <ul style="list-style-type: none"> - make generalisations with the assistance of probing questions and prompts <p>review their work and reasoning, e.g.</p> <ul style="list-style-type: none"> - respond to 'What if?' questions - when they have solved a problem, pose a similar problem for a partner

Ma1 Using and applying mathematics, level 3

Pupils try different approaches and find ways of overcoming difficulties that arise when they are solving problems. They are beginning to organise their work and check results. Pupils discuss their mathematical work and are beginning to explain their thinking. They use and interpret mathematical symbols and diagrams. Pupils show that they understand a general statement by finding particular examples that match it.

Number Ma2

Level	Numbers and the number system	FDPRP	Operations and the relationships between them	Mental methods	Solving numerical problems	Written and calculator methods
3c	<p>Understand and use £ p notation.</p> <p>Know what each digit in a 3 digit number represents (including 0 as a place holder).</p> <p>Order numbers to 1000.</p> <p>Multiply integers by 10.</p> <p>Count on or back in tens or hundreds from any 2 or 3 digit number.</p>	<p>Recognise unit fractions and use to find fractions of whole numbers and shapes.</p> <p>Begin to recognise simple equivalent fractions e.g. fractions equivalent to $\frac{1}{2}$.</p>	<p>Recognise \div as inverse of multiplication.</p> <p>Understand division as repeated subtraction, grouping or sharing.</p> <p>Begin to find remainders after division.</p>	<p>Know by heart all \div facts for each number to 20.</p> <p>\div mentally a near multiple of 10 to/from a 2 digit number.</p> <p>Bridge through a multiple of 10 then adjust.</p> <p>Use known facts and place value to carry out mentally simple $\times \div$</p> <p>Check with an equivalent calculation.</p> <p>Know by heart facts for the 2, 5, and 10 \times tables.</p>	<p>Solve one step whole number problems appropriately using mental addition and subtraction, simple multiplication and division.</p>	<p>Use informal written methods e.g. a number line to solve \div of 2 digit numbers</p> <p>Use a number line to record division including remainders.</p>
3b	<p>Read and write whole numbers to at least 1000 and position on a number line.</p> <p>Multiply/divide whole numbers by 10 with whole number answers.</p> <p>\div 1, 10, 100 to any number.</p> <p>Recognise sequences of multiples of 2, 5 and 10.</p> <p>Recognise negative numbers in contexts such as temperature.</p> <p>Count back through zero</p>	<p>Use decimal notation for tenths.</p> <p>Recognise fraction/decimal equivalence of $\frac{1}{2}$ and $1/10$.</p> <p>Begin to relate fractions to division</p> <p>Use simple fractions that are several parts of a whole including pairs of fractions that total 1.</p> <p>Find $\frac{1}{2}, \frac{1}{4}, 1/3, 1/5, 1/10$ of shapes and sets of objects.</p>	<p>Recognise that some numbers can be represented as different arrays</p> <p>Derive associated \div facts from known \times facts e.g. given $14 \times 5 = 70$ create $5 \times 14 = 70, 70 \div 5 = 14, 70 \div 14 = 5.$</p> <p>Begin to understand the role of '=', the equals sign e.g. balancing problems such as $7 \times 10 = 82 - ?$</p>	<p>\div mentally 2 digit numbers using known facts and place value.</p> <p>Use mental recall of 2, 3, 4, 5 & 10 \times tables</p>	<p>Use mental recall of \div facts to 20 in solving problems involving larger numbers.</p> <p>Solve whole number problems, including those involving \times or \div that give rise to remainders.</p> <p>Solve 2 step problems that involve + and -</p>	<p>Add & subtract numbers with 3-digits using written methods including those involving bridging through 10 and 100.</p> <p>Multiply, using the grid method, 2-digit numbers by 2, 3, 4 or 5 or 10.</p> <p>Divide 2 digit numbers using a number line to support repeated subtraction or grouping, by 2, 3, 4 or 5 or 10 with whole number answers and remainders e.g. $49 \div 3$.</p>
3a	<p>Multiply/divide whole numbers by 10 and 100 with whole number answers.</p> <p>Round any positive integer less than 1000 to the nearest 10 or 100.</p>	<p>Use decimal notation for tenths and hundredths.</p> <p>Position 1 and 2 place decimals on a number line.</p> <p>Interpret mixed numbers and position on a number line.</p> <p>Recognise equivalent fractions e.g. $6/8 = 3/4$ and $7/100 = 0.07$.</p> <p>Find fractions of numbers and shapes e.g. $2/3$ of £15.</p>	<p>Develop understanding of operations of $\times \div$ and their relationship to each other and to \div.</p> <p>Check with the inverse operation.</p>	<p>Find a small difference by counting up (bridging through 10 or 100).</p> <p>Begin to know multiplication facts for 6x, 7x, 8x and 9x tables.</p>	<p>Round up or down after \div depending on context.</p> <p>Choose & use appropriate number operations and appropriate ways of calculating e.g. mental, mental with jottings, pencil and paper to solve two step problems, including converting pounds to pence.</p>	<p>Do column addition of more than 2 whole numbers less than 1000.</p> <p>Begin to use informal methods of recording $\times \div$</p>

Ma2 Number, level 3

Pupils show understanding of place value in numbers up to 1000 & use this to make approximations. They begin to use decimal notation & to recognise negative numbers, in contexts such as money & temperature. Pupils use mental recall of addition & subtraction facts to 20 in solving problems involving larger numbers. They add & subtract numbers with two digits mentally & numbers with 3 digits using written methods. They use mental recall of the 2, 3, 4, 5 & 10 \times tables & derive the associated division facts. They solve whole number problems involving \times or \div , including those that give rise to remainders. They use simple fractions that are several parts of a whole & recognise when two simple fractions are equivalent.

Shape, Space and Measures Ma3

Handling Data Ma4

Level	Shape	Position and movement	Measures	Processing & representing data	Interpreting data
3c	<p>Demonstrate that a shape has reflective symmetry by folding.</p> <p>Begin to recognize angles bigger or smaller than a right angle.</p>	<p>Describe and identify the position of a square on a grid of squares.</p> <p>Use the 4 compass directions to describe movement around a grid.</p>	<p>Begin to understand angle as a measurement of turn</p> <p>Begin to use notation for m and cm.</p> <p>Read labelled and unlabelled scales</p> <p>Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock</p>	<p>Gather information & construct bar graphs and pictograms labelled in ones then twos.</p> <p>Organise numerical data into Venn & Carroll diagrams (2 criteria).</p>	<p>Begin to interpret bar graphs and pictograms labelled in ones then twos.</p>
3b	<p>Classify 2D & 3D shapes using mathematical properties e.g. reflective symmetry.</p> <p>Recognise shapes with no lines of symmetry.</p> <p>Recognise common 3D shapes. Relate to drawings and photographs of them.</p> <p>Begin to understand the terms 'regular' & 'irregular' 2-D shapes.</p> <p>Sort shapes according to more than one criterion.</p> <p>Begin to use the terms obtuse and acute.</p> <p>Recognise right angled & equilateral triangle</p>	<p>Describe a route using the language of position and direction e.g. clockwise/anticlockwise</p> <p>Reflect shapes presented on a grid in a vertical or horizontal mirror line.</p>	<p>Recognise angles as a measure of turn and know that one whole turn is 360 degrees.</p> <p>Use standard units of measure (length, mass, capacity) in a range of contexts.</p> <p>Read labelled divisions accurately.</p> <p>Know relationship between familiar measures e.g. m, cm, km etc.</p> <p>Find start or end times for a given time interval.</p>	<p>Construct bar charts and pictograms where the intervals or symbols represent a group of units (2s, 10s).</p> <p>Make appropriate choices for recording data e.g. tally chart or frequency table.</p>	<p>Extract and interpret information presented in simple tables and lists.</p> <p>Interpret data in Venn and Carroll diagrams (2 criteria).</p>
3a	<p>Sort regular and irregular polygons using mathematical properties.</p> <p>Begin to recognise nets of familiar 3-D shapes.</p>	<p>Plot co-ordinates in the first quadrant.</p> <p>Sketch the reflection of a shape in a mirror touching a side or not.</p> <p>Recognise horizontal and vertical lines.</p> <p>Use the 8 compass points to describe direction.</p>	<p>Know & use relationships between measurements.</p> <p>Read with accuracy labeled, partially labeled & unlabelled scales to the nearest tenth of a unit.</p> <p>Know that angles are measured in degrees.</p> <p>Read the time to the nearest minute using a.m./p.m.</p> <p>Calculate time intervals from clocks and timetables.</p> <p>Begin to understand area as a measure of surface and perimeter as a measure of length.</p>	<p>Decide what data to collect to answer a question</p> <p>Decide upon an appropriate scale for a graph.</p>	<p>Interpret bar charts and pictograms where the intervals or symbols represent a group of units (2s, 5s, 10s, and 20s).</p> <p>In the context of data relating to everyday situations, understand the idea of "certain" and "impossible" relating to probability.</p>

Ma3 Shape, space and measures, level 3

Pupils classify 3-D & 2-D shapes in various ways using mathematical properties such as reflective symmetry for 2-D shapes. They use non- standard units, standard metric units of length, capacity & mass & standard units of time, in a range of contexts.

Ma4 Handling data, level 3 (included in programme of study for Ma2 Number in Key Stage 1)

Pupils extract & interpret information presented in simple tables & lists. They construct bar charts & pictograms, where the symbol represents a group of units, to communicate information they have gathered, & they interpret information presented to them in these forms.

Using and applying maths Ma1			
Level	Problem solving	Communicating	Reasoning
4	<p>develop own strategies for solving problems, e.g.</p> <ul style="list-style-type: none"> - 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 & ensure solutions make sense - review their work and approaches <p>use their own strategies in applying mathematics to practical context</p> <ul style="list-style-type: none"> - use mathematical content from levels 3&4 to solve problems & investigate 	<p>present information and results in a clear and organised way, e.g.</p> <p>organise written work, e.g. record results in order begin to work in an organised way from the start consider appropriate units use related vocabulary accurately</p>	<p>search for a solution by trying out ideas of their own, e.g.</p> <ul style="list-style-type: none"> - check their methods and justify answers - identify patterns as they work and form their own generalisations/rules in words
<p>Ma1 Using and applying mathematics, level 4</p> <p>Pupils are developing their own strategies for solving problems & are using these strategies both in working within mathematics & in applying mathematics to practical contexts. They present information & results in a clear & organised way. They search for a solution by trying out ideas of their own.</p>			

Number Ma2						
Level	Numbers and the number system	FDPRP	Operations and the relationships between them	Mental methods	Solving numerical problems	Written and calculator methods
4c	<p>Multiply/divide whole numbers by 10 and 100 -decimal answers</p> <p>Read, write and order numbers including decimals and explain what each digit represents</p> <p>Count in steps of constant size including decimals extending beyond zero when counting backwards</p> <p>Recognise multiples of 6,7,8 and 9</p>	<p>Convert mixed numbers to improper fractions and vice versa</p> <p>eg $11\frac{1}{2} = 5\frac{1}{2}$</p> <p>Recognise simple equivalence between fractions, decimals and percentages</p> <p>eg $\frac{1}{2}, \frac{1}{4}, 1/10, 3/4$</p>		<p>Add mentally, partitioning into HTU & add most significant digit first.</p> <p>Find differences by counting up through next multiple of 10 or 100 or 1000</p> <p>Begin to know multiplication facts for 6,7,8 and 9x tables</p> <p>Use closely related facts and partitioning to x and ÷</p> <p>Estimate & check by approximating (round to nearest 10/100)</p>	<p>Solve two step problems choosing appropriate operations</p>	<p>Do column +/- of 2 integers less than 10 000</p> <p>Use informal and refined methods for x/÷ (TU x U, TU ÷ U)</p> <p>Begin to know when to use a calculator</p>
4b	<p>Identify square numbers</p> <p>Find pairs of factors for any number to 100</p> <p>Order a set of positive/negative integers</p> <p>Recognise and describe number patterns</p>	<p>Add and subtract decimals to 2 places</p>	<p>Use inverse operations eg use a calculator and inverse operations to find a missing number</p> <p>Derive division facts that correspond to multiplication facts up to 10x10</p>	<p>Make and justify estimates of large numbers/quantities</p> <p>In solving number problems, use a range of mental methods of computation with the 4 operations</p> <p>Recall multiplication facts up to 10 x 10 and corresponding ÷ facts</p>	<p>Interpret a calculator display of 4.5 as £4.50 in money</p> <p>Check reasonableness of results with reference to the context or size of numbers</p> <p>Solve single or multistep problems choosing appropriate operations.</p> <p>Carry out simple calculations involving negative numbers in context.</p>	<p>Use efficient written methods of +/-</p> <p>Use efficient written methods of x/÷ (HTUxU, HTU÷U)</p> <p>Add and subtract decimals to 2 places</p> <p>Use appropriate ways of calculating: mental, mental with jottings, written methods, calculator</p>
4a	<p>Round any number to nearest 10,100,1000</p> <p>Round numbers with 2 decimal places to the nearest integer</p> <p>Recognise and describe number relationships including multiple, factor and square</p>	<p>Order decimals to 3 decimal places</p> <p>Begin to understand simple ratio</p> <p>Relate fractions to decimal representations</p> <p>Understand % as number of parts in every hundred</p> <p>Recognise approximate proportions of a whole & use simple fractions & %s to describe these</p>	<p>Understand and use relationships between 4 operations eg to undo two step problems</p> <p>Understand the use of brackets in simple calculations</p>	<p>Calculate mentally differences by counting up through next multiple of 10, 100, 1000</p>	<p>Choose and use all 4 operations to solve simple word problems involving numbers and quantities including simple conversion of currency and finding simple percentages</p> <p>Begin to use simple formulae expressed in words</p>	<p>Use written methods for x (TU x TU)</p> <p>Use written methods for x of numbers including decimals (U.txU)</p> <p>Compare methods of recording</p>
<p>Ma2 Number, level 4</p> <p>Pupils use their understanding of place value to multiply & divide whole numbers by 10 or 100. In solving number problems, pupils use a range of mental methods of computation with the 4 operations, including mental recall of multiplication facts up to 10 x 10 and quick derivation of corresponding division facts. They use efficient written methods of + & subtraction and of short multiplication & division. They add & subtract decimals to 2 places & order decimals to 3 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 & use simple fractions & percentages to describe these. Pupils recognise & describe number patterns, & relationships including multiple, factor & square. They begin to use simple formulae expressed in words. Pupils use & interpret coordinates in the 1st quadrant.</p>						

Shape, Space and Measures Ma3				Handling Data Ma4	
Level	Shape	Position and movement	Measures	Processing and representing data	Interpreting data
4c	<p>Recognise and name most quadrilaterals</p> <p>eg trapezium, parallelogram, rhombus</p> <p>Visualise shapes & recognize them in different orientations.</p>	<p>Sketch the reflection of a shape in a mirror at any angle to the shape</p> <p>Complete symmetrical patterns with 2 lines of symmetry at right angles</p> <p>Begin to rotate a simple shape about its centre or a vertex</p>	<p>Find areas by counting squares</p> <p>Know 24 hour clock</p> <p>Use timetables</p>	<p>Collect discrete data and record using a frequency table</p> <p>Construct simple line graphs</p> <p>In graphs and charts use axes labelled in 2s, 5s, 10s, 20s, or 100s</p>	<p>Interpret the total amount of data represented</p>
4b	<p>Recognise right angled, equilateral, isosceles and scalene triangles</p> <p>Make 3D mathematical models</p> <p>Use mathematical terms such as horizontal, vertical, congruent</p> <p>Understand why a square is a special sort of rectangle</p>	<p>Reflect shapes accurately in a mirror line</p> <p>Translate shapes horizontally or vertically.</p> <p>Complete a rectangle drawn on a grid which has two sides drawn at an oblique angle to the grid</p>	<p>Choose & use a variety of units & measuring instruments</p> <p>Interpret with appropriate accuracy numbers on a range of measuring instruments</p> <p>Find perimeter of simple shapes</p> <p>Use "number of squares in a row times number of rows" to find the area of a rectangle</p> <p>Understand area is measured in square cm</p> <p>Measure and draw acute and obtuse angles to the nearest 5°</p> <p>Calculate time durations that go over the hour</p>	<p>Test a hypothesis about the frequency of an event by collecting data</p> <p>Continue to use Venn and Carroll diagrams</p> <p>eg sorting numbers into multiples of 8 and multiples of 6</p>	<p>Understand and use mode and range to describe sets of data</p> <p>Interpret the scale on bar graphs and line graphs, reading between the labelled divisions</p> <p>Compare data sets and respond to questions</p>
4a	<p>Make and draw shapes with increasing accuracy and apply knowledge of their properties</p>	<p>Rotate a simple shape about its centre or a vertex</p>	<p>Use a protractor to measure and draw acute and obtuse angles to the nearest degree</p> <p>Find areas of shapes that need to be divided into rectangles</p> <p>Read and interpret timetables</p>	<p>Group data in equal class intervals</p> <p>Represent collected data in frequency diagrams</p>	<p>Interpret data in frequency diagrams</p> <p>Interpret line graphs where intermediate points have meaning</p> <p>Interpret simple pie charts</p> <p>In the context of data relating to everyday situations understand the language of probability</p> <p>Eg more likely, equally likely, fair, unfair, certain</p>

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.

Ma4 Handling data, level 4

Pupils collect discrete data & record them using a frequency table. They understand & use the mode & 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.

Using and applying maths Ma1			
Level	Problem solving	Communicating	Reasoning
5	<p>identify and obtain necessary information to carry through a task and solve mathematical problems, e.g.</p> <ul style="list-style-type: none"> - 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 <p>check results, considering whether these are reasonable, e.g.</p> <ul style="list-style-type: none"> - check as they work, spotting and correcting errors and reviewing methods <p>solve word problems & investigations from a range of context, e.g.</p> <ul style="list-style-type: none"> - use mathematical content from levels 4 & 5 to solve problems & investigate 	<p>show understanding of situations by describing them mathematically using symbols, words and diagrams, e.g.</p> <ul style="list-style-type: none"> - 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 	<p>draw simple conclusions of their own and give an explanation of their reasoning, e.g.</p> <ul style="list-style-type: none"> - 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

Ma1 Using and applying mathematics, 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.

Number Ma2

Level	Numbers and the number system	FDPRP	Operations and the relationships between them	Mental methods	Solving numerical problems	Using and Applying maths Algebra
5	<p>use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000 and explain the effect</p> <p>round decimals to the nearest decimal place</p> <p>order negative numbers in context</p> <p>recognise and use number patterns and relationships, e.g.</p> <ul style="list-style-type: none"> - find two-digit prime numbers - make generalisations about sequences saying whether much larger numbers will be in the sequence or not 	<p>use equivalence between fractions, e.g.</p> <ul style="list-style-type: none"> - convert fractions such as 2/5 into tenths or hundredths and express them as decimals or percentages and vice versa <p>reduce a fraction to its simplest form by cancelling common factors</p> <p>order fractions and decimals, e.g.</p> <ul style="list-style-type: none"> - order fractions with different denominators - order decimals that have a mixture of one, two or three decimal places <p>understand simple ratio</p>	<p>use known facts, place value and knowledge of operations to calculate, e.g.</p> <ul style="list-style-type: none"> - 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 or quantity, e.g. 3/8 of 400g or 60% of £300 <p>apply inverse operations</p> <p>use brackets appropriately, e.g.</p> <ul style="list-style-type: none"> - know and use the order of operations, including brackets 	<p>add and subtract negative numbers in context</p> <p>estimate using approximations</p> <p>use all four operations with decimals to two places, e.g.</p> <ul style="list-style-type: none"> - add and subtract numbers that do not have the same number of decimal places - multiply or divide decimal numbers by a single digit, e.g. 31.62 × 7 <p>use a calculator where appropriate to calculate fractions/percentages of quantities/measurements, e.g.</p> <ul style="list-style-type: none"> - find fractions of quantities such as 3/8 of 980 - find percentages such as 15% of 360g <p>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 (HTU X TU)</p>	<p>solve simple problems involving ordering, adding, subtracting negative numbers in context</p> <p>solve simple problems involving ratio and direct proportion, e.g.</p> <ul style="list-style-type: none"> - begin to use multiplication rather than trial and improvement to solve ratio problems <p>approximate to check answers to problems are of the correct magnitude</p> <p>check solutions by applying inverse operations or estimating using approximations</p>	<p>construct, express in symbolic form, and use simple formulae involving one or two operations, e.g.</p> <ul style="list-style-type: none"> - 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 <p>use and interpret coordinates in all four quadrants</p>

Ma2 Number, level 5

Pupils use their understanding of place value to \times & \div whole numbers & decimals by 10, 100 & 1000. They order, + & 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 & solve simple problems involving ratio & direct proportion. They calculate fractional or percentage parts of quantities & measurements, using a calculator where appropriate. Pupils understand & use an appropriate non-calculator method for solving problems that involve \times and \div any 3-digit number by any 2-digit number. They check their solutions by applying inverse operations or estimating using approximations. They construct, express in symbolic form, & use simple formulae involving 1 or 2 operations. They use brackets appropriately. Pupils use and interpret coordinates in all 4 quadrants.

Shape, Space and Measures Ma3

Handling Data Ma4

Level	Shape	Position and movement	Measures	Specifying the problem, planning and collecting data	Processing and representing data	Interpreting data
5	<p>use a wider range of properties of 2-D and 3-D shapes</p> <p>understand 'parallel' and begin to understand 'perpendicular' in relation to edges or faces</p> <p>classify quadrilaterals, including trapezium and kite, using their properties, e.g. number of parallel sides</p> <p>reason about special triangles and quadrilaterals, e.g. given the perimeter and one side of an isosceles triangle, find both possible triangles</p> <p>draw a parallelogram or trapezium of a given area on a square grid</p> <p>given the coordinates of three vertices of a parallelogram, find the fourth</p> <p>know and use the angle sum of a triangle and that of angles at a point, e.g.</p> <ul style="list-style-type: none"> - 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 	<p>identify all the symmetries of 2-D shapes (for rotation symmetry see KS3 programme of study)</p> <ul style="list-style-type: none"> - find lines of reflection symmetry in shapes and diagrams - recognise order of rotation symmetry <p>transform shapes</p> <ul style="list-style-type: none"> - 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 <p>reason about shapes, positions and movements</p> <ul style="list-style-type: none"> - visualise a 3-D shape from its net and match vertices that will be joined - 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 	<p>measure and draw angles to the nearest degree, when constructing models or drawing e.g.</p> <ul style="list-style-type: none"> - 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 1 mm and 2°) <p>use language associated with angle</p> <p>read and interpret scales on a range of measuring instruments, explaining what each labelled division represents</p> <p>solve problems involving the conversion of units, e.g.</p> <ul style="list-style-type: none"> - solve problems such as 1.5 kg ÷ 30 g - work out approximately how many km are equivalent to 20 miles <p>make sensible estimates of a range of measures in relation to everyday situations</p> <p>understand and use the formula for the area of a rectangle and distinguish area from perimeter</p> <ul style="list-style-type: none"> - find the length of a rectangle given its perimeter and width - find the area or perimeter of simple shapes, given some edge lengths 	<p>ask questions, plan how to answer them and collect the data required</p> <p>in probability, select methods based on equally likely outcomes and experimental evidence, as appropriate</p> <ul style="list-style-type: none"> - decide whether a probability can be calculated or whether it can only be estimated from the results of an experiment <p>understand that different outcomes</p>	<p>understand and use the mean of discrete data, e.g.</p> <ul style="list-style-type: none"> - use the mean of a set of measurements from a science experiment <p>understand and use the probability scale from 0 to 1 (from the KS3 programme of study)</p> <p>use methods based on equally likely outcomes and experimental evidence, as appropriate, to find and justify probabilities, and approximations to these e.g.</p> <ul style="list-style-type: none"> - compare two spinners to find which is more likely to result in an even number <p>create and interpret line graphs where the intermediate values have meaning, e.g.</p> <ul style="list-style-type: none"> - draw and use a conversion graph for pounds and euro 	<p>compare two simple distributions, using the range and one of mode, median or mean (mean and median are drawn from the KS3 programme of study)</p> <ul style="list-style-type: none"> - describe and compare two sets of football results, by using the range and mode - solve problems such as 'Find five numbers where the mode is 6 and the range is 8' <p>interpret graphs and diagrams, including pie charts, and draw conclusions</p> <ul style="list-style-type: none"> - complete a two-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, e.g. 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, e.g. 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

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.

Ma4 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.

