Mathematics Assessment grid
Year 5 Understanding and investigating within number

	Working towards Year 5 expectations	Working at the expected Y5 expectations	Going to greater depth with Y5 expectations
Place value, ordering and rounding			
• **Counting reading, writing, comparing, ordering and rounding whole numbers using place value**	Counts forwards or backwards in steps of powers of 10 from any given number beyond 1 000.	Counts forwards or backwards in steps of powers of 10 from any given number up to 1 000 000 and beyond	Uses knowledge and understanding of place value of large numbers to investigate and explore problems and statements about numbers including in real life contexts. May gather and research numerical data from a range of sources. Explains their thinking and reasoning. Interprets information using negative numbers in a range of contexts and explains reasoning behind statements about negative numbers. Appreciates and explains the difference between the Roman numeral system and our own number system and those of other cultures. Applies understanding of the number system and properties of numbers to investigate and explore more complex problems involving sequences and structures within number. Relates these to representations and patterns and explains and develops use of term to term rules.
	Reads, writes, orders and compares numbers beyond 1000 and determines the place value of each digit.	Reads, writes, orders and compares numbers to at least 1 000 000 and determines the place value of each digit in a wide range of contexts, including measurement.	
	Rounds any number beyond 1 000 to the nearest 10, 100, 1 000, 10 000.	Rounds any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000	
	Continues to develop understanding of negative numbers in context, counts forwards and backwards with positive and negative whole numbers, including through zero	Interprets negative numbers in context, counts forwards and backwards with positive and negative whole numbers, including through zero. Places positive and negative integers in order and starts to calculate intervals across zero.	
	Continues to read Roman numerals to 100 and beyond.	Read Roman numerals to 1 000 (M) and recognise years written in Roman numerals.	
	Applies understanding of the number system to solve number problems and practical problems involving numbers, money or measures.	Applies understanding of the number system to solve number problems and practical problems involving numbers, money or measures	
• **Properties of numbers and number sequences**	Continues to use the vocabulary of factors and multiples. Starts to understand the idea of prime and square numbers supported with practical materials. Continue to practice to recognize multiples of numbers up to 12 x 12, to recognize patterns in sequences of multiples and connections between them. *Know and apply tests of divisibility.*	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Identify common multiples Knows and uses the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19. Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}). Use understanding of the terms factor, multiple and prime, square and cube numbers to construct equivalence statements (e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9^2 x 10).	
• **Recognising and describing patterns**	Recognises and extends number sequences in steps of constant size, extending beyond zero when counting back.	Start to recognise and describe linear number sequences, including those involving fractions and decimals and start to find the term to term rule.	
Fractions, Decimals and Percentages.	Continues to develop understanding of fractions as numbers, measures and operators by finding, fractions of numbers and quantities	Continues to develop understanding of fractions as numbers, measures and operators by finding a wider range of fractions of numbers and quantities.	

	Continues to count in steps of fractions including bridging through zero, for example on a number line. Compare and order familiar fractions.	Compares and order fractions whose denominators are all multiples of the same number.	When working with fractions, decimals and percentages shows strong understanding of the connections between these, and the wider number system, and is able to explain thinking and represent ideas using a range of representations, including those they generate themselves. Moves readily between different representations involving ideas of proportion. When presented with statements to evaluate involving fractions, decimals or percentages is able to justify and explain their thinking. Can make statements of their own about given situations involving proportion. Solves more complex problems involving fractions, decimals and percentages explaining their reasoning. Poses their own problems in these contexts.
	Continues to recognise and show, using diagrams, families of common equivalent fractions.	Identifies, name s and writes equivalent fractions of a given fraction, represented visually, including tenths and hundredths.	
	Connect equivalent fractions > 1 that simplify to integers with division and other fractions > 1 to division with remainders, using the number line and other models, and starts to move from these to improper and mixed fractions.	Recognises mixed numbers and improper fractions and converts from one form to the other and writes mathematical statements > 1 as a mixed number (e.g. $^2/_5 + {}^4/_5 = {}^6/_5 = 1{}^1/_5$).	
	Continues to add and subtract fractions with the same denominator practising through increasingly complex problems beyond one whole.	Adds and subtracts fractions with the same denominator and with denominators that are multiples of the same number extending to calculations that exceed 1 as a mixed number.	
	Starts to multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	Multiplies proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Connects multiplication by a fraction to using fractions as operators (fractions of) and to division. Relates to scaling by fractions.	
Decimals	Continues to recognise and write decimal equivalents of any number of tenths or hundredths. Continues to recognise and write decimal equivalents to ¼, ½, ¾,	Reads and writes decimal numbers as fractions (e.g. $0.71 = {}^{71}/_{100}$). Recognizes and uses thousandths and relate them to tenths, hundredths, decimal equivalents and measures.	
	Continues to compare and order numbers and quantities with the same number of decimal places up to two decimal places.	Reads, writes, orders and compares numbers with up to three decimal places. Mentally adds and subtracts tenths.	
	Continues to round decimals with one decimal place to the nearest whole number.	Rounds decimals with two decimal places to the nearest whole number and to one decimal place.	
Percentages	Starts to recognize the per cent symbol (%) and understands that per cent relates to "number of parts per hundred",	Recognizes the per cent symbol (%) and understands that per cent relates to "number of parts per hundred", and writes percentages as a fraction with denominator 100 and as a decimal.	
Application	Continues to understand decimals and fractions are different ways of expressing proportions using familiar numbers and applies in arrange of problems	Solves problems which require knowing percentage and decimal equivalents of $^1/_2$, $^1/_4$, $^1/_5$, $^2/_5$, $^4/_5$ and those with a denominator of a multiple of 10 or 25 in a range of contexts. Solve problems with numbers to three decimal places.	

Mathematics Assessment grid
Year 5 Developing and applying calculation

	Working towards Year 5 expectations	Working at the expected Y5 expectations	Going to greater depth with Y5 expectations
Understanding the four number operations and the links between them	Understands and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive to support calculation and to solve number puzzles, routine and non-routine problems and explains reasoning.	Understands and use the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive to support calculation and to solve number puzzles, routine and non-routine problems in arrange of contexts and explains reasoning.	Understands and uses the relationships between the four operations and the principles of the arithmetic laws; commutative, associative and distributive to support calculation and to solve more complex number puzzles, routine and non-routine problems and clearly explains reasoning. (Distributivity can be expressed as a(b+c) = ab + ac). Explains how they have checked accuracy of their calculations or solutions to problems using a range of approaches
	Use rounding**,** estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy	Use rounding**,** estimation and inverse operations to check answers to calculations and determine, in the context of a problem, levels of accuracy	
Addition and subtraction • **Mental calculation**	Add and subtract numbers mentally with increasingly large numbers e.g. Use place value and known facts to subtract one near multiple of 100 from another e.g. 607 – 499 = 108 or 2 146 – 1998 = 148. Explains methods.	Add and subtract numbers mentally with increasingly large numbers e.g. Use place value and known facts to subtract one near multiple of 1000 from another e.g. 6097– 4070 or 12 462 – 2300. Explains methods	Adds and subtracts increasingly large numbers mentally. Explains when and why a mental approach is more appropriate than a written method with reference to the properties of the numbers involved. Mentally adds and subtracts decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (e.g.0.83+ 0.17 =1). Demonstrates good understanding of structure of numbers and relationships between them and can use this to show how numbers in a calculation may be adapted to keep a sum or difference the same. Use this when appropriate to support calculation. Can represent their thinking using different approaches.
	Mentally add and subtract tenths.	Mentally add and subtract tenths, and one digit whole numbers and tenths.	
• **Written calculation**	Continues to add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).	
• **Problem solving**	Solve addition and subtraction multi-step problems with appropriate numbers in contexts, deciding which operations and methods to use and why Solve calculation problems using information from a range of table and charts.	Solve addition and subtraction multi-step problems with appropriate numbers in contexts, deciding which operations and methods to use and why Solve calculation problems using information from a range of table and charts.	Solve more complex addition and subtraction multi-step problems with appropriate numbers in contexts, deciding which operations and methods to use and why. Use information from a range of table and charts to solve and pose own problems.
Multiplication and division • **Mental calculation**	Multiply and divide numbers mentally drawing upon known facts, place value and properties of numbers to support mental calculation with larger numbers and decimals	Multiply and divide numbers mentally drawing upon known facts, place value and properties of numbers to support mental calculation with larger numbers and decimals.	Multiplies and divides numbers, including larger numbers, fractions and decimals using written or mental methods as appropriate, depending on the properties of the numbers. Demonstrates good understanding of structure of numbers and relationships between them and can use this to show how numbers in a calculation may be adapted to keep a product or quotient the same. Use this when appropriate to support calculation. Represents thinking using different approaches.
	Multiply and divide whole numbers and those involving decimals by 10 and 100.	Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.	
	Uses multiplication and division as inverses e.g. by multiplying and dividing by powers of ten in scale drawings or by powers of 1000 in converting between units such as kilometres and meters.	Uses multiplication and division as inverses e.g. by multiplying and dividing by powers of ten in scale drawings or by powers of 1000 in converting between units such as kilometres and meters.	

	Uses and explains the equals sign to indicate equivalence, including in missing number problems (e.g. 2 x 24 = 12 x 4; 33 = 5 x ◊).	Uses and explains the equals sign to indicate equivalence, including in missing number problems (e.g. 2 x 24 = 12 x 4; 33 = 5 x ◊).	Solves more complex multiplication and division problems, and problems involving all four number operations, with appropriate numbers in a range of contexts, deciding which operations and methods to use and why. Use information from a range of table and charts to solve and pose own problems. Explores and investigates within the context of number using their knowledge and understanding of numbers and their properties and showing appreciation of structure and relationships within the number system.
	Solve problems involving multiplication and division including using their knowledge of factors and multiples.	Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares, cubes and primes.	
Multiplication and division • **Written methods**	Multiply numbers up to 4 digits by a one digit number using a formal written method, including short multiplication.	Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including short multiplication and long multiplication for two-digit numbers.	
	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and start to interpret remainders appropriately for the context as fractions, as decimals or by rounding.	Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context as fractions, as decimals or by rounding.	
Multiplication and division • **Problem solving**	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign.	Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	

Mathematics Assessment grid
Year 5 Measurement

	Working towards Year 5 expectations	Working at the expected Y5 expectations	Going to greater depth with Y5 expectations
Measurement	Continue to use read and write standard metric units and their abbreviations, developing fluency in their relationships. Suggest and use suitable units and equipment for measuring and read scales to an appropriate degree of accuracy.	Continue to use read and write standard metric units and their abbreviations, developing fluency in their relationships. Suggest and use suitable units and equipment for measuring and read scales to an appropriate degree of accuracy	Demonstrate understanding of and fluency with units of metric measure and appreciation of equivalences (including metric / imperial equivalences) to solve more complex puzzles and problems, explaining thinking.
• **Measuring length, mass/weight and capacity / volume**	Continues to convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) using knowledge of place value and multiplication / division	Convert fluently between different units of metric measure in a wide range of contexts (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) using knowledge of place value and multiplication / division	Investigate and explore within measures situations showing the results of their investigations and explaining findings clearly Start to express relationships algebraically if appropriate e.g. Using the relations of perimeter or area to find unknown lengths, missing measures questions such as these can be expressed algebraically e.g. 4 + 2b = 20 for a rectangle of sides 2cm and b cm and perimeter 20cm.
		Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints.	
	Starts to estimate volume (e.g. using 1 cm^3 blocks to build cubes / cuboids) and capacity (e.g. using water).	Estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water).	
	Continue to measure and calculate the perimeter of rectilinear shapes in centimetres and metres.	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.	
	Consolidate finding the area of rectilinear shapes by counting squares or by using multiplication. For rectangles start to use the formula, length x breadth = area, expressed in words.	Calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes. For rectangles use the formula, length x breadth = area, expressed in words or symbols. Use the relations of perimeter or area to find unknown lengths	
• **Temperature**		*Continues to measure temperature to solve problems in this context.*	
• **Time**	Continue to read the time, interpret simple timetables and use units of time, including to solve problems involving converting between units of time	Continue to read the time, interpret timetables and use units of time, including to solve problems involving converting between units of time**.**	Continue to read the time, interpret more complex timetables and use units of time, including to solve more complex problems involving converting between units of time**.**
	Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.	Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.	Use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.

Mathematics Assessment grid
Year 5 Geometry

	Working towards Year 5 expectations	Working at the expected Y5 expectations	Going to greater depth with Y5 expectations
Geometry: **Properties of shapes**	Continue to draw and construct 2D / 3D shapes with increasing accuracy.	Continue to draw and construct 2D / 3D shapes with accuracy. Use conventional markings for parallel lines and right angles.	Use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, e.g. through using dynamic geometry ICT tools. Explore given statements about shapes and their properties and solve more complex problems about shapes explaining thinking and showing good understanding of properties of shapes. Investigate in the context of shape, position and direction, showing workings, including drawings and explaining findings using correct mathematical vocabulary. Use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems
	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Explain reasoning using mathematical vocabulary.	
		Explore and use properties of quadrilaterals e.g. diagonals and parallel sides to classify and solve problems	
	Start to use the properties of rectangles to deduce related facts and find missing lengths and angles.	Use the properties of rectangles to deduce related facts and find missing lengths and angles.	
	Identify 3D shapes, including cubes and other cuboids, from 2D representations.	Identify a wider range of 3D shapes, including cubes and other cuboids, from 2D representations. Show understanding of nets of shapes.	
	Know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles.	Draw given angles and measure them in degrees (°).	
	Start to identify: • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and ½ a turn (total 180°) • other multiples of 90°.	Identify: • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and ½ a turn (total 180°) • other multiples of 90°.	
Geometry: **Position and direction**	Continue to confidently describe movements between positions as translations of a given unit to the left/right and up/down.	Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	Identify, describe and represent the position of more complex shapes following a reflection or translation, using the appropriate language fluently, and know that the shape has not changed
	Recognise and use translation in a variety of diagrams including a 2D grid and coordinates in the first quadrant.	Recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.	Recognise and use reflection and translation in a *wider* variety of diagrams, including continuing to use a 2D grid and coordinates in the first quadrant or beyond if appropriate. Reflection should be in lines that are parallel to the axes
	Solve problems, involving reasoning about shapes and their properties, position and direction.	Solve problems, involving reasoning about shapes and their properties, position and direction.	Solve more complex problems, involving reasoning about shapes and their properties, position and direction.

Mathematics Assessment grid

Year 5 Statistics

Statistics	Working towards Year 5 expectations	Working at the expected Y5 expectations	Going to greater depth with Y5 expectations
	Continue to interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Use a greater range of scales in representations. and suggest appropriate scales.	Complete, read and interpret information in a wide range of charts and tables, including timetables.	Begin to decide which representations of data are most appropriate and why. Show greater understanding of data in charts and tables relating it to real life situations.
	Begin to relate the graphical representation of data to recording change over time.	Connect work on coordinates and scales to interpretation of time graphs	Connect work on coordinates and scales to their interpretation of time graphs, explaining their thinking and relating the information to real life situations.
	Confidently solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and in a line graph.	Solves and poses more complex comparison, sum and difference problems using information presented in line graphs and a wide range of other diagrams. Applying understanding in a greater range of contexts.