2014 National Curriculum

Mathematics – Domain Progression Across Key Stages 1 & 2

1. Number: Number and Place Value
2. Number: Addition and Subtraction
3. Number: Multiplication and Division
4. Number: Fractions
5. Number: Ratio & Proportion
6. Measurement
7. Geometry: Properties of Shape
8. Geometry: Position and Direction
9. Statistics
10. Algebra

1: Number & Place Value	1	2	3	4	5	6
Counting	▪ count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number ▪ count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens (previously 1-20)	▪ count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward	▪ count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	▪ count in multiples of 6, 7, 9, 25 and 1000 ▪ count backwards through zero to include negative numbers ▪ find 1000 more or less than a given number	▪ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 ▪ interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	▪ use negative numbers in context, and calculate intervals across zero
Place Value (Reading, Writing, Ordering, Comparing and Valuing Numbers)	▪ given a number, identify one more and one less ▪ read and write numbers from 1 to 20 in numerals and words.	▪ recognise the place value of each digit in a two-digit number (tens, ones) ▪ read and write numbers to at least 100 in numerals and in words (previously included reading and writing 3 digit numbers) ▪ compare and order numbers from 0 up to 100; use <, > and = signs	▪ recognise the place value of each digit in a three-digit number (hundreds, tens, ones) ▪ read and write numbers up to 1000 in numerals and in words ▪ compare and order numbers up to 1000	▪ recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) ▪ order and compare numbers beyond 1000	▪ read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	▪ read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
Identifying, Representing and Estimating Number	▪ identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least	▪ identify, represent and estimate numbers using different representations, including the number line	▪ identify, represent and estimate numbers using different representations	▪ identify, represent and estimate numbers using different representations		
Rounding		▪ round any number to the nearest 10	▪ round any number to the nearest 100	▪ round any number to the nearest 10, 100 or 1000	▪ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	▪ round any whole number to a required degree of accuracy
Problem Solving		▪ use place value and number facts to solve problems.	▪ solve number problems and practical problems involving these ideas.	▪ solve number and practical problems that involve all of the above and with increasingly large positive numbers	▪ solve number problems and practical problems that involve all of the above	▪ solve number and practical problems that involve all of the above.
Roman Numerals			▪ read Roman numerals to 12, and recognise the numerals for 50 and 100	▪ read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value	▪ read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	
Non Statutory Guidance	Pupils practise counting (1, 2, 3…), ordering (for example, first, second, third…), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent. Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations. They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions. They recognise and create repeating patterns with objects and with shapes.	Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third. As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations. Pupils should partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a placeholder.	Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100. They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, 146 = 100 + 40 and 6, 146 = 130 + 16). Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.	Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice. They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far. They connect estimation and rounding numbers to the use of measuring instruments. Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time..	Pupils identify the place value in large whole numbers. They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far. They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule. They should recognise and describe linear number sequences (for example, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$...), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add $\frac{1}{2}$).	Pupils use the whole number system, including saying, reading and writing numbers accurately.

2: Addition & Subtraction	1	2	3	4	5	6
Problem Solving	▪ solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = [ ] – 9. ▪ Use practical contexts and associated terms (put together; add; altogether; total; difference between; distance between; more than; less than…)	▪ solve problems with addition and subtraction: ▪ ***using concrete objects and pictorial representations, including those involving numbers, quantities and measures ▪ applying their increasing knowledge of mental and written methods	▪ solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction. ▪ solve problems involving addition, subtraction, multiplication and division e.g. If I double a number and add six and the answer is 18, what was the number?	▪ solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. ▪	▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why (including decimals)	▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why (including fractions, decimals and percentages) ▪ solve problems involving addition, subtraction, multiplication and division
Facts	▪ represent and use number bonds and related subtraction facts within 20 e.g. 9+7=16, 16-7=9, 7=16-9	▪ recall and use addition and subtraction facts to 20 (previously just pairs that make 20 and facts to 10) fluently, and derive and use related facts up to 100 e.g. 3+7=10 so 30+70=100	▪ Complements to 100	▪ Complements to 1000	▪ Complements of decimals to one whole	▪ Complements to 100 to 2d.p.
Understanding and Using Statements & Relationships	▪ read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs ▪ establish that – means subtract (take away is method) ▪ use inverses to establish link between addition and subtraction. ▪ Understand concept of difference	▪ show that addition of two numbers can be done in any order (commutative) e.g. 5+2+1= 2+1+5= 1+5+2= and subtraction of one number from another cannot ▪ recognise and use the inverse relationship between addition & subtraction and use this to check calculations and solve missing number problems. ▪ Extend understanding of language to include sum and difference ▪ Understand subtraction as taking away or finding the difference.	▪ estimate the answer to a calculation and use inverse operations to check answers e.g. using rounding	▪ estimate and use inverse operations to check answers to a calculation	▪ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	▪ use estimation (including rounding to the nearest 20/50 if appropriate to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. ▪ use their knowledge of the order of operations to carry out calculations involving the four operations ▪ Introduce brackets and how this affects calculation
Addition and Subtraction – Mental & Written Methods **previously this was taught but not specified	▪ add and subtract one-digit and two-digit numbers to 20, including zero ▪ understand the effect of adding or subtracting zero. ▪ Methods used for addition and subtraction – link to VCP (U+U, U-U within 20, Teens + U, Teens subtract U)	▪ add and subtract numbers **using concrete objects, pictorial representations, and mentally, (with number lines or jottings), including: ▪ a two-digit number & ones ▪ a two-digit number and tens ▪ two two-digit numbers ▪ adding three one-digit numbers ▪ Refer to VCP for methods. ▪ Finding small difference using number lines	▪ add and subtract numbers mentally, including: ▪ a three-digit number and ones ▪ a three-digit number and tens ▪ a three-digit number and hundreds ▪ add and subtract numbers with up to three digits, using formal written methods including expanded method of columnar addition and subtraction - where appropriate – ie. Only use when a mental method or jotting is not more efficient	▪ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction (+ money / decimals) where appropriate – ie. Only use when a mental method or jotting is not more efficient ▪ Continue to add and subtract mentally using jottings if appropriate. ▪ Use understanding of the value of the number to decide when to calculate mentally and when to use written method.	▪ add and subtract whole numbers with more than 4 digits, (and decimals with up to 3 dp) including using formal written methods (columnar addition and subtraction) ▪ add and subtract numbers mentally with increasingly large numbers	▪ add and subtract any set of whole numbers and decimals using an appropriate written method ▪ perform mental calculations, including with mixed operations and large numbers ▪ Continue to use written methods to add and subtract whole numbers. ▪ Use written methods to add and subtract decimals.
Non Statutory Guidance	Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations. Pupils combine and increase numbers, counting forwards and backwards. They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.	Pupils extend their understanding of the language of addition and subtraction to include sum and difference. Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10; 10 – 7 = 3 and 7 = 10 – 3 to calculate 30 + 70 = 100; 100 – 70 = 30 and 70 = 100 – 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition. Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers	Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100. Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see Mathematics Appendix 1).	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see English Appendix 1)	Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Mathematics Appendix 1). They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1). They undertake mental calculations with increasingly large numbers and more complex calculations. Pupils continue to use all the multiplication tables to calculate maths statements in order to maintain their fluency. Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. Common factors can be related to finding equivalent fractions.

3: Multiplication & Division	1	2	3	4	5	6
Problem Solving	▪ solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. (previously practical grouping and sharing problems) Including operation signs x, ÷ and = (in readiness for number sentences in Y2)	▪ solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. ▪ Use a variety of language to describe multiplication and division	▪ solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects. ▪ Understand scaling a number by a scale factor of 3 as making the number (or measurement) 3 times larger ▪ Link scaling to the understanding of multiplication e.g. 6+6+6 = 6x3	▪ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects. ▪ Reproduce shape according to scale factor	▪ solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes ▪ 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.	▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why ▪ solve problems involving addition, subtraction, multiplication and division ▪ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
Facts	• Doubling and halving numbers 1-10 • Counting in twos, fives and tens	▪ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers ▪ Doubling and halving numbers 1-20 ▪ Counting in 3s, 4s and 8s	▪ recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables ▪ doubling facts of multiples of 10 up to double 100 ▪ Counting in 6s, 7s, 9s, 11s, 12s ▪ Connect 2, 4 and 8x through doubling	▪ recall multiplication and division facts for multiplication tables up to 12 × 12 ▪ doubling facts of multiples of 100/1000 ▪ doubling multiples of 10 beyond 100	▪ establish whether a number up to 100 is prime and recall prime numbers up to 19	▪
Understanding and Using Statements & Relationships	• Practical application of grouping and sharing to find simple fractions of objects, numbers and quantities e.g. ½ and ¼ • Make connections between arrays, number patterns, and counting in twos, fives and tens	▪ show that multiplication of two numbers can be done in any order (commutative) e.g. 3x5=5x3 and division of one number by another cannot e.g.15÷3≠3÷15 ▪ Introduce the concept of remainders ▪ Begin to relate multiplication and division to fractions e.g. ½ is the same as ÷2	▪ Understand remainders in the context of division	▪ use place value e.g. 600÷3=200, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers ▪ recognise and use factor pairs and commutativity in mental calculations e.g. 18x6=2x9x2x3=9x3x2x2=108 ▪ Interpret remainders, rounding up or down depending on context	▪ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers ▪ know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers ▪ recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})	▪ identify common factors, common multiples and prime numbers ▪ finding prime factors of 2 digit numbers, and testing for prime numbers beyond 100 ▪ use their knowledge of the order of operations to carry out calculations involving the four operations ▪
Multiplication and Division – Mental & Written Methods		▪ calculate mathematical statements for multiplication and division grouping within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	▪ write estimate and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods	▪ Estimate and multiply two-digit and three-digit numbers by a one-digit number using a formal written layout including grid method ▪ Short division of TU÷U and HTU÷U ▪ Use mental arithmetic strategies when appropriate, e.g. partitioning, chunking and jottings ▪ Doubling numbers 1-100 as a strategy ▪ multiply and divide whole numbers and those involving decimals by 10 and 100	▪ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, (including grid) including long multiplication for two-digit numbers ▪ multiply and divide numbers mentally drawing upon known facts ▪ 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 ▪ Express remainders in different ways e.g. 98÷4= 98/4=24r2=24½=24.5~25 ▪ Use mental arithmetic strategies when appropriate, e.g. partitioning, chunking and jottings ▪ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	▪ multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication ▪ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context ▪ divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context ▪ perform mental calculations, including with mixed operations and large numbers ▪ Use mental arithmetic strategies when appropriate, e.g. partitioning, chunking and jottings

3: Multiplication & Division

Non Statutory Guidance

Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example, 40 ÷ 2 = 20, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example, 4 × 5 = 20 and 20 ÷ 5 = 4).

Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.

Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240) and multiplication and division facts (for example, using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (for example, 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3).

Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.

Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6).

Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answers (see Mathematics Appendix 1).

Pupils write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, 2 x 6 x 5 = 10 x 6 = 60.

Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children

Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Mathematics Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.

They use and understand the terms factor, multiple and prime, square and cube numbers.

Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 = \frac{98}{4} = 24 \text{ r } 2 = 24\frac{1}{2} = 24.5 \approx 25$).

Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.

Distributivity can be expressed as $a(b + c) = ab + ac$.

They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35;
3 x 270 = 3 x 3 x 9 x 10 = 9^2 x 10).

Pupils use and explain the equals sign to indicate equivalence, including in missing number problems (for example, 13 + 24 = 12 + 25; 33 = 5 x $\square$).

Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1).

They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.

Common factors can be related to finding equivalent fractions.

4: Fractions	1	2	3	4	5	6
Recognising, Finding, Naming and Writing Fractions inc. Equivalent Fractions	▪ recognise, find and name a half as one of two equal parts of an object, shape or quantity ▪ recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. (previously 'use halves and quarters in context) Equivalent ½ = 2/4	▪ recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity ▪ write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ & $\frac{1}{2}$. ▪ Order simple fractions on a numberline. ▪ Use <>= with simple fractions	▪ recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators ▪ recognise and use fractions as numbers: unit fractions and non-unit fractions (understand what they are) with small denominators ▪ Add in 1/5, 1/6, 2/3, 3/5. ▪ Decimals – link to money i.e. tenths / hundredths. ▪ Link to division. E.g. 15 divided by 3 is 15/3 ▪ Ongoing <>=	▪ recognise and show, using diagrams, families of common equivalent fractions ▪ recognise and write decimal equivalents of any number of tenths or hundredths ▪ recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ 1/5 ▪ compare numbers with the same number of decimal places up to two decimal places# ▪ Ongoing <>=	▪ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] ▪ read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$] ▪ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents ▪ recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal plus FDP equivalence. ▪ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	▪ use common factors to simplify fractions; use common multiples to express fractions in the same denomination ▪ associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$] ▪ recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. (halves, quarters, thirds, fifths, eighths, tenths, and explore sixths, ninths and elevenths)
Counting & Ordering	• Counting in halves to 10. • Add ½ to ½	• Counting in ½, ¼. 1/3 up to 10. • Add ¼ 1/3 e.g. ¼ + 2/4 Also, 1 1/3 + 1/3 = 1 2/3	▪ count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 ▪ compare and order unit fractions, and fractions with the same denominators ▪ read, write, order and compare numbers up to one decimal place (money link). ▪ Counting in 1/5 1/10, 1/100	▪ count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Number line ▪ read, write, order and compare numbers with up to two decimal places (or 3 in measures) ▪ round decimals with one decimal place to the nearest whole number ▪	▪ read, write, order and compare numbers with up to three decimal places ▪ round decimals with two decimal places to the nearest whole number and to one decimal place ▪ compare and order fractions whose denominators are all multiples of the same number	▪ compare and order fractions, including fractions > 1 ▪ Recurring decimals. ▪ Rounding recurring decimals to 1, 2 and 3 dp.
Adding, Subtracting, Dividing & Multiplying Fractions	▪ Sharing and division link	• Practical problem solving + and – fractions above – e.g. pizza, cake, chocolate bars etc. • Sharing and division link	▪ add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$] ▪ Also under 10. ▪ Sharing and division link ▪ Complements of 1 to 1dp (2dp with money)	▪ add and subtract fractions with the same denominator beyond one whole, and convert to a mixed number ▪ find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths ▪ Sharing and division link ▪ Complements of 1 to 1 and 2 dp. E.g. 0.8 +0.2 = 1.0, 0.83 + 017 = 1.00 etc	▪ add and subtract fractions with the same denominator and denominators that are multiples of the same number ▪ multiply and divide whole numbers and decimals numbers by 10 and 100, giving answers up to two decimal places ▪ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	▪ add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions ▪ identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places ▪ multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] ▪ divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] ▪ multiply one-digit numbers with up to two decimal places by whole numbers ▪ use written division methods in cases where the answer has up to two decimal places

Fractions:

Problem Solving

		▪ Find simple fractions of amounts. E.g. ½ of £20, ▪ Fractions of simple measures / different 2d shapes e.g. ¼ of 12cm. Shade 1/3 of this square 2 different ways.	▪ solve problems that involve all of the above. and simple measures (cm-m, kg/g, l, ml and money (see y4). ▪ ▪ Find unit fractions of amounts. E.g ½, 1/3, ¼ of 12kg ▪	▪ solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number ▪ Find both unit and non-unit fractions of amounts.E.g. 3/8 of £24 ▪ solve simple measure and money problems involving fractions and decimals to two decimal places.(3 with measures).	▪ solve problems involving number up to three decimal places ▪ Find fractions and percentages of amounts ▪ solve problems which require knowing percentage and decimal equivs. of $\frac{1}{2}$, $\frac{1}{4}$, ¾ $\frac{1}{5}$, $\frac{2}{5}$, 3/5, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	▪ solve problems which require answers to be rounded to specified degrees of accuracy ▪
Non Statutory Guidance	Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.	Pupils use fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet as the first example of a non-unit fraction. Pupils should count in fractions up to 10, starting from any number and using the and equivalence on the number line (for example, 1 , 1 (or 1), 1 , 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.	Pupils connect tenths to place value, decimal measures and to division by 10. They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, including relating this to measure. Pupils understand the relation between unit fractions as operators (fractions of), and division by integers. They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity. Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.	Pupils should connect hundredths to tenths and place value and decimal measure. They extend the use of the number line to connect fractions, numbers and measures. Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths. Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (for example, $\frac{6}{9} = \frac{2}{3}$ or $\frac{1}{4} = \frac{2}{8}$). Pupils continue to practise adding and subtracting fractions with the same denominator, to become fluent through a variety of increasingly complex problems beyond one whole. Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions. Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100. They practise counting using simple fractions and decimals, both forwards and backwards. Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.	Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions. They extend their knowledge of fractions to thousandths and connect to decimals and measures Pupils 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 hence move from these to improper and mixed fractions. Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1. Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number. Pupils continue to practise counting forwards and backwards in simple fractions. Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities. Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line. Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems. They mentally add and subtract tenths, and one-digit whole numbers and tenths. They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (for example, 0.83 + 0.17 = 1). Pupils should go beyond the measurement and money models of decimals, for example, by solving puzzles involving decimals. Pupils should make connections between percentages, fractions and decimals (for example, 100% represents a whole quantity and 1% is $\frac{1}{100}$, 50% is $\frac{50}{100}$, 25% is $\frac{25}{100}$) and relate this to finding 'fractions of'.	Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (for example, $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$) and progress to varied and increasingly complex problems. Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle. Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if $\frac{1}{4}$ of a length is 36cm, then the whole length is 36 × 4 = 144cm). They practise calculations with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators. Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (for example, 3 ÷ 8 = 0.375). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 × 2 = 0.8, and in practical contexts, such as measures and money. Pupils are introduced to the division of decimal numbers by one-digit whole number, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication. Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers..

5: Ratio and Proportion	1	2	3	4	5	6
Ratio and Proportion	• Simple sequences Make this pattern 2 blue and 1 red. Continue it.	• Recognise simple regular patterns and comment on them.	▪ Solve problems involving similar shapes where the scale factor is known. ▪ Recognise more complex regular (and simple irregular) patterns e.g. 2 red, 3 green and 4 blue and comment on them. RRGGGBBBB Next one RGGRGRGGRG 3 green 2 red.	▪ Solve problems involving similar shapes where the scale factor is known. ▪ Solve simple problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts e.g. I use 3l red and 1l white tubs of paint to make 4l of pink. How many red paint tubs do I need for 12l of pink?	▪ Solve simple problems involving similar shapes where the scale factor is known or can be found. ▪ Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. e.g. In a class there are 30 children. For every 3 boys there are 2 girls. How many boys in the class? Problems e.g. altering a recipe from 2 – 6 people e.g. 1 egg, 3 spoons of flour – 3 eggs, 9 spoons of flour. ▪ solve problems involving the calculation of percentages 10% 25% 50% 75% 40% etc	▪ solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts ▪ solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison ▪ solve problems involving similar shapes where the scale factor is known or can be found ▪ Solve problems involving unequal sharing & grouping using knowledge of fractions & multiples.
Non Statutory Guidance						Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). Pupils link percentages or 360° to calculating angles of pie charts. Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation *a*:*b* to record their work. Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', '$\frac{3}{5}$ of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion

6: Measurement	1	2	3	4	5	6
Calculating					▪ use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	▪ solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
Measuring length, mass, temperature, capacity (volume), perimeter & area	▪ compare, describe and solve practical problems for: ▪ lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] ▪ mass/weight [for example, heavy/light, heavier than, lighter than] ▪ capacity and volume [for example, full/empty, more than, less than, half, half full, quarter] ▪ time [for example, quicker, slower, earlier, later] ▪ measure (using measuring tools e.g. rulers, scales etc) and begin to record the following:(using non standard units then manageable common standard units): ▪ lengths and heights ▪ mass/weight ▪ capacity and volume ▪ time (hours, minutes, seconds)	▪ compare and order lengths, mass, volume/capacity and record the results using >, < and =(include comparison using multiples e.g twice as wide). ▪ choose and use appropriate standard units to estimate and measure using standard abbreviations) length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels	▪ measure, using appropriate tools and units-progressing to using a wider range of measures, including mixed units e.g. 1kg and 200g), compare and find simple equivalents e.g. 5m = 500cm, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) ▪ measure the perimeter of simple 2-D shapes ▪ The comparison of measures includes simple scaling by integers (e.g. a given quantity or measure is twice as long or 5 times as high) and this connects to multiplication.	▪ Convert between different units of measure [for example, kilometre to metre; hour to minute] ▪ measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres ▪ find the area of rectilinear shapes by counting squares– relate area to arrays and multiplication. ▪ estimate, compare and calculate different measures, including money in pounds and pence	▪ convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) ▪ understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints ▪ measure and calculate the perimeter of composite rectilinear shapes including using the relations of perimeter to find unknown lengths in centimetres and metres ▪ calculate and compare the area of rectangles (including squares) including using the relations of area to find unknown lengths,, and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes ▪ calculate the area from scale drawings using given measurements ▪ estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water	▪ use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places ▪ convert between miles and kilometres ▪ recognise that shapes with the same areas can have different perimeters and vice versa ▪ recognise when it is possible to use formulae for area and volume of shapes ▪ calculate the area of parallelograms and triangles ▪ calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].
Money	▪ recognise and know the value of different denominations of coins and notes	▪ recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value ▪ find different combinations of coins that equal the same amounts of money ▪ solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change	▪ add and subtract amounts of money to give change, using both £ and p in practical contexts	▪ estimate, compare and calculate different measures, including money in pounds and pence		

Measurement **Time**	▪ sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] ▪ recognise and use language relating to dates, including days of the week, weeks, months and years ▪ tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.	▪ compare and sequence intervals of time ▪ tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times ▪ know the number of minutes in an hour and the number of hours in a day.	▪ tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (am & pm) ▪ estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight ▪ know the number of seconds in a minute and the number of days in each month, year and leap year ▪ compare durations of events [for example to calculate the time taken by particular events or tasks].	▪ read, write and convert time between analogue and digital 12- and 24-hour clocks ▪ solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	▪ solve problems involving converting between units of time	
Non Statutory Guidance	The pairs of terms: mass and weight, volume and capacity, are used interchangeably at this stage. Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (for example, counting) and continuous (for example, liquid) measurement, to using manageable common standard units. In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers. Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past.	Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations. Comparing measures includes simple multiples such as 'half as high'; 'twice as wide'. They become fluent in telling the time on analogue clocks and recording it. Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.	Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (for example, 1 kg and 200g) and simple equivalents of mixed units (for example, 5m = 500cm). The comparison of measures includes simple scaling by integers (for example, a given quantity or measure is twice as long or five times as high) and this connects to multiplication. Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4. Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.	Pupils build on their understanding of place value and decimal notation to record metric measures, including money. They use multiplication to convert from larger to smaller units. Perimeter can be expressed algebraically as $2(a + b)$ where a and b are the dimensions in the same unit. They relate area to arrays and multiplication.	Pupils use their knowledge of place value and multiplication and division to convert between standard units. Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example $4 + 2b = 20$ for a rectangle of sides 2 cm and b cm and perimeter of 20cm. Pupils calculate the area from scale drawings using given measurements. Pupils use all four operations in problems involving time and money, including conversions (for example, days to weeks, expressing the answer as weeks and days).	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this. Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate

7: Geometry - Shapes	1	2	3	4	5	6
Recognising, naming, drawing, comparing & classifying 2D & 3D Shapes	▪ recognise and name common 2-D and 3-D shapes, including: ▪ 2-D shapes [for example, rectangles (including squares), circles and triangles] ▪ 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].	▪ identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line ▪ identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces ▪ identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid] ▪ compare and sort common 2-D and 3-D shapes and everyday objects.	▪ draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	▪ compare and classify geometric shapes, including quadrilaterals – and triangles**,** based on their properties and sizes	▪ identify 3-D shapes, including cubes and other cuboids, from 2-D representations ▪ distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	▪ draw 2-D shapes using given dimensions and angles ▪ recognise, describe and build simple 3-D shapes, including making nets ▪ compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons ▪ illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
Angles and Symmetry			▪ recognise angles as a property of shape or a description of a turn ▪ identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle ▪ identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	▪ identify acute and obtuse angles and compare and order angles up to two right angles by size ▪ identify lines of symmetry in 2-D shapes presented in different orientations ▪ complete a simple symmetric figure with respect to a specific line of symmetry.	▪ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles ▪ draw given angles, and measure them in degrees (°) ▪ identify: ▪ angles at a point and one whole turn - (total 360°) ▪ angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) ▪ other multiples of 90° ▪ use the properties of rectangles to deduce related facts and find missing lengths and angles	▪ recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
Non Statutory Guidance	Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.	Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces. Pupils read and write names for shapes that are appropriate for their word reading and spelling. Pupils draw lines and shapes using a straight edge	Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle. Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts.	Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular. Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.	Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles. Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools. Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems.	Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 - (b + c)$.

8: Geometry – Position & Direction	1	2	3	4	5	6
Describing	▪ describe position, direction and movement, including whole, half, quarter and three-quarter turns.	▪ use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).		▪ describe positions on a 2-D grid as coordinates in the first quadrant ▪ 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.	▪ describe positions on the full coordinate grid (all four quadrants)
Representing		▪ order and arrange combinations of mathematical objects in patterns and sequences		▪ plot specified points and draw sides to complete a given polygon.	▪ (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.	▪ draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
Non Statutory Guidance	Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside. Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face.	Pupils should work with patterns of shapes, including those in different orientations. Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).		Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5), including using coordinate-plotting ICT tools.	Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.	Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers. Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to $(a - 2, b + 3)$; (a, b) and $(a + d, b + d)$ being opposite vertices of a square of side d.

9: Statistics	1	2	3	4	5	6
Representations	▪	▪ interpret and construct simple pictograms, tally charts, block diagrams and simple tables	▪ interpret and present data using bar charts, pictograms and tables	▪ interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.	▪ complete, read and interpret information in tables, including timetables.	▪ interpret and construct pie charts and line graphs and use these to solve problems
Problem Solving		▪ ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity ▪ ask and answer questions about totalling & comparing categorical data.	solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.	▪ 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 a line graph	▪ calculate and interpret the mean as an average.
Non Statutory Guidance		Pupils record, interpret, collate, organise and compare information (for example, using many-to-one correspondence in pictograms with simple ratios 2, 5, 10).	Pupils understand and use simple scales (for example, 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy. They continue to interpret data presented in many contexts	Pupils understand and use a greater range of scales in their representations. Pupils begin to relate the graphical representation of data to recording change over time.	Pupils connect their work on coordinates and scales to their interpretation of time graphs. They begin to decide which representations of data are most appropriate and why.	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set.

10: Algebra	1	2	3	4	5	6
Algebra	• Counting in constant step sizes with different start numbers, forwards and backwards, with 100 sq and bead string • Missing number sentences, balancing either side of the equals sign • Introduce the vocabulary of sequences • Continue PRACTICAL pattern work • One step function machines	• Recording terms of a 'sequence' • Generating +ve and –ve sequences • Balance puzzles • Counting games with different start numbers and step sizes, with support such as 100 square and bead string • Understanding 'inverses' • Describing a sequence, term to term, using/ understanding times tables as 'terms' of a sequence	• Counting in constant steps, related to repeated addition and times tables • Two step function machines • Build linear sequences practically with straws and cubes • Growing linear patterns • Extend balance puzzles wit eg shapes as numbers, more than one variable • Generate simple formulae with eg simple shapes and 'Taktiles' • Concept of algebraic notation eg practical missing number envelopes	• Use of the constant function on a calculator eg inputting x to find y • Generating a negative sequence beyond zero • Plotting sequences eg x tables in +ve quadrant • Line graphs of linear sequences in context • Simple formulae related to shape eg perimeter and area of squares and rectangles and compound shapes • Balance puzzles with symbols	• Extended balance and missing number puzzles • Counting and describing non-linear sequences eg square and triangular numbers...Fibonacci • Line graphs in 4 quadrants, including finding co-ordinates of a line given the 'rule', position to term • Problem solving with line graphs and sequences	▪ use simple formulae ▪ generate and describe linear number sequences ▪ express missing number problems algebraically ▪ find pairs of numbers that satisfy an equation with two unknowns ▪ enumerate possibilities of combinations of two variables.
Non Statutory Guidance						Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: - missing numbers, lengths, coordinates and angles - formulae in mathematics and science - equivalent expressions (for example, $a + b = b + a$) - generalisations of number patterns - number puzzles (for example, what two numbers can add up to).