BRAIN*tastic*! Maths-

Correlation with the Revised UK National Numeracy Strategy

Core learning in mathematics by year

Foundation stage

Most children learn to:

Using and applying mathematics	Counting and understanding number	Knowing and using number facts	Calculating
Use developing mathematical ideas and methods to solve practical problems. Match sets of objects to numerals that represent the number of objects. Sort objects, making choices and justifying decisions Recreate simple patterns	**Use number names in order in familiar contexts** Know that numbers identify how many objects are in a set **Count reliably up to 10 everyday objects** Count in ones, twos, fives, or tens **Use language such as 'more' and 'less' to compare two numbers** Use ordinal numbers in different contexts **Recognise numerals 1 to 9**	Observe number relationships and patterns in the environment and use these to derive facts **Find one more or one less than a number from 1 to 10** Select two groups of objects to make a given total of objects	**Begin to relate addition to combining two groups of objects and subtraction to 'taking away'** Count repeated groups of the same size. Share objects into equal groups and count how many in each group.

Core learning in mathematics by year

Foundation stage

Most children learn to:

Understanding shape	Measuring	Handling Data
Use familiar objects and common shapes to create and recreate patterns and build models	**Use language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities**	Sort familiar objects to identify their similarities and differences
Use language such as 'circle' or 'bigger' to describe the shape and size and of solids and flat shapes **Use everyday words to describe position**	Use everyday language relate to time; order and sequence familiar events short periods of time	Count how many objects share a particular property, presenting results using pictures, drawings or numerals

Core learning in mathematics by year

Year 1

Most children learn to:

Using and applying mathematics

Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change'

Describe a puzzle or problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution in the original context

Answer a question by sorting information, shapes or objects; display results using tables and pictures.

In simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions

Counting and understanding number

Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same

Compare and order numbers, using the related vocabulary; use the equals (=) sign

Read and write numerals from 0 to 20, then beyond, use knowledge of place value to position these numbers on a number track and number line

Say the number that is 1 more or less than any given number and 10 more or less for multiples of 10

Knowing and using number facts

Derive and recall all pairs of numbers with a total of 10 and addition facts for totals to at least 5; work out the corresponding subtraction facts

Count on or back in ones, twos, fives and tens and use this knowledge to derive the multiples of 2, 5, and 10 to the tenth multiple

Recall the doubles of all numbers to at least 10

Calculating

Relate addition to counting on; recognise that addition can be done in order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two digit number

Understand subtraction as 'take away' and find 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number

Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences

Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups

Core learning in mathematics by year

Year 1

Most children learn to:

Understanding shape

Visualise and name common 2-D shapes and 3-D solids and describe there features; use them to make patterns, pictures and models

Identify objects that turn about a point (e.g. scissors) or about a line (e.g. door); recognise and make whole, half and quarter turns

Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board (grid)

Measuring

Estimate the size or weight of objects, using suitable non-standard or standard measurements, compare objects.

Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour.

Handling Data

Answer a question, recording information in lists and tables

Use diagrams to sort objects into groups according to a given criterion

Core learning in mathematics by year

Year 2

Most children learn to:

Using and applying mathematics

Solve problems involving addition, subtraction, multiplication or division in contexts of numbers measures or pounds and pence

Identify and record the information or calculation needed to solve a puzzle or problem; carry out the steps or calculations

Follow a line of enquiry; answer questions selecting, organising and presenting information in lists, tables and simple diagrams

Describe patterns and relationships involving numbers or shapes, make predictions.

Present solutions to puzzles and problems in an organised way

Counting and understanding number

Read and type two digit and three digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers

Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two-digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of 10 and 1.

Order two-digit numbers and position them on a number line; use the greater than (>) and less than (<) signs

Find one half, one quarter and three quarters of shapes and sets of objects

Knowing and using number facts

Derive and recall all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals up to 100

Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves

Derive and recall multiplication facts for the 2, 5 and 10 times-tables and relate division facts; recognise multiples of 2, 5, and 10

Use knowledge of number facts and operations to estimate and check answers to calculations

Calculating

Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical mental methods to add and subtract two-digit numbers

Understand that subtraction is the inverse of addition and vice versa; use this to derive and record related addition and subtraction number sentences.

Represent repeated addition and arrays as multiplication, and sharing (grouping) as division; use practical methods and related vocabulary to support multiplication and division, including calculations with remainders

Use the symbols +, -, x, ÷ and = record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence (e.g. ☐ ÷ 2 = 6, 30-☐=24)

Core learning in mathematics by year

Year 2

Most children learn to:

Understanding shape

Visualise common 2-D and 3-D shapes and 3-D solids; identify shapes from pictures of them in different positions and orientations; sort and describe shapes referring to their properties

Identify reflective symmetry in patterns and 2-D shapes and place lines of symmetry on the shapes

Follow and give instructions involving position, direction and movement

Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn

Measuring

Estimate and compare lengths, weights and capacities choosing and using standard units and identify suitable measuring instruments. Compare lengths with a virtual ruler.

Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15, and 20 numbered)

Use units of time (seconds, minutes, hours, days) and know the relationship between them; read the time to the quarter hour; identify time intervals, including those that cross the hour

Handling Data

Use lists, tables and diagrams to sort objects; sort using appropriate language, including 'not'

Core learning in mathematics by year

Year 3

Most children learn to:

Using and applying mathematics

Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations

Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context where appropriate using £.p notation or units of measure

Follow a line of enquiry by deciding what information is important; make and use lists tables and graphs to organise and interpret the information.

Identify patterns and relationships involving numbers or shapes, and use these to solve problems

Counting and understanding number

Read and type and order whole numbers to at least 1000 position them on a number line; count on from and back to zero in single-digit steps or multiples of 10

Partition three-digit numbers into multiples of 100, 10 and 1 in different ways

Round two digit or three digit numbers to the nearest 10 or 100 and give estimates for their sums and differences

Read and write proper fractions (e.g. $^{3}/_{7}$, $^{8}/_{9}$), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents.

Knowing and using number facts

Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100

Derive and recall multiplication facts for the 2, 3, 4, 5, 6, and 10 times tables and the corresponding division facts; recognise multiples of 2, 5, or 10 up to 1000

Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations

Calculating

Add or subtract mentally combinations of one-digit and two-digit numbers

Develop and use written methods to record and support addition and subtraction of two-digit and three-digit numbers

Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect

Use practical and mental methods to multiply and divide two-digit numbers (e.g. 13 x 3, 50 ÷ 4); round remainders up or down, depending on the context

Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences

Find unit fractions of numbers and quantities (e.g. $^{1}/_{2}$, $^{1}/_{3}$, ¼ and $^{1}/_{6}$ of 12 litres)

Core learning in mathematics by year

Year 3

Most children learn to:

Understanding shape

Relate 2_D shapes and 3-D solids to drawings of them; describe, visualise, classify the shapes.

Complete shapes with reflective symmetry; select and place the reflection of a shape in a mirror line long one side.

Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid

Compare angles with a right angle, recognise that a straight line is equivalent to two right angles.

Measuring

Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements

Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy

Read the time on a 12 hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval

Handling Data

Answer a question by organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations.

Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion

Core learning in mathematics by year

Year 4

Most children learn to:

Using and applying mathematics

Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate

Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in context of the problem

Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers

Counting and understanding number

Recognise and continue number sequences formed by counting on or back in steps of constant size

Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line.

Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement

Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths

Use diagrams to identify equivalent fractions (e.g. $^{6}/_{8}$ and $^{3}/_{4}$, or $^{70}/_{100}$ and $^{7}/_{10}$); interpret mixed numbers and position them on a number line (e.g. 3 ½)

Use vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads or 2 beads in every 5 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the bow are green')

Knowing and using number facts

Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000

Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves

Derive and recall multiplication 10 x 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple

Use knowledge of rounding, number operations and inverse to estimate

Identify pairs of fractions that total 1

Calculating

Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35)

Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p

Multiply and divide numbers to 1000 by 10 and the 100 (whole-numbered answers), understanding the effect

Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 x 9, 98 ÷ 6)

Find fractions of numbers, quantities or shapes (e.g. $^{1}/_{5}$ of 30 plums)

Core learning in mathematics by year

Year 4

Most children learn to:

Understanding shape

Draw polygons and classify them by their properties, including their line symmetry

Visualise 3-D objects from 2-D drawings; make nets of common solids

Recognise horizontal and vertical lines; use the eight compass points to describe direction and identify the position of a square on a grid of squares

Know that angles are measured in degrees and that one whole turn is 360^{o}; compare and order angles less than 180^{o}

Measuring

Choose and use standard metric units and their abbreviations when estimating and recording length, weight and capacity; know the meaning of 'kilo', 'centi', and 'milli' and where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg)

Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit

Consider rectangles, calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares

Read time to the nearest minute; use am, pm and 12-hour clock notation; chose units of time to measure time intervals; calculate time intervals from clocks and timetables

Handling Data

Answer a question by identifying what data to collect, organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts

Core learning in mathematics by year

Year 5

Most children learn to:

Using and applying mathematics

Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies

Represent a puzzle of problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem

Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false

Counting and understanding number

Count from any given number in whole-number and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line

Explain what each digit represents in whole numbers and decimals with up to two decimal places, and partition, round and order these numbers

Express a smaller whole number as a fraction of a larger one (e.g. recognise that 5 out of 8 is 5/8); find equivalent fractions (e.g. 7/10 = 14/20, or 19/10 = 1 9/10); relate fractions to their decimal representations

Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages

Understand sequences to scale numbers up or down; solve problems involving proportions of quantities (e.g. decrease quantities in a recipe designed to feed six people)

Knowing and using number facts

Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34)

Recall quickly multiplication facts up to 10 x 10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts

Identify pairs of factors of two-digit whole numbers and find common multiples (e.g. for 6 and 9)

Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations

Calculating

Extend mental methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12 x 9), to multiply by 25 (e.g. 16 x 25), to subtract one near-multiple of 1000 from another (e.g. 6070 – 4097)

Use efficient written methods to add and subtract whole numbers and decimals with up to two places

Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000

Refine and use efficient mental methods to multiply and divide HTU x U, TU x TU, U.t x U and HTU ÷ U

Find fractions using division (e.g. 1/1000 of 5 kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80)

Core learning in mathematics by year

Year 5

Most children learn to:

Understanding shape

Identify, visualise and describe the properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to identify 2-D shapes and to identify nets of 3-D shapes

Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes

Complete patterns with up to two lines of symmetry; show the position and orientation of the shape after reflection or translation

Calculate angles in a straight line

Measuring

Read, choose, use and record standard metric units to estimate and measure length, weight, capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600kg)

Interpret a reading that lies between two unnumbered divisions on a scale

Calculate the perimeter of regular and irregular polygons and use the formula for the area of a rectangle to calculate the rectangle's area.

Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals.

Handling Data

Describe the occurrence of familiar events using the language of chance or likelihood

Answer a set of related questions by collecting selecting and organising relevant data; draw conclusions

Find and interpret the mode of a set of data

Core learning in mathematics by year

Year 6

Most children learn to:

Using and applying mathematics

Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage

Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy

Represent and interpret sequences, patterns and relationships involving numbers and shapes; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)

Explain reasoning and conclusions, using words symbols or diagrams as appropriate

Counting and understanding number

Find the difference between a positive and a negative integer, or two negative integers, in context

Use decimal notation for tenths, hundredths and thousands; partition, round and order decimals with up to three places, and position them on the number line.

Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents $^{8}/_{5}$ or $1\ ^{3}/_{5}$ pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator

Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fractions

Solve simple problems involving direct proportion by scaling quantities up or down

Knowing and using number facts

Use knowledge of place value and multiplication facts to 10 x 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 x 7, 4.8 ÷ 6)

Use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12 and the corresponding squares of multiples of 10

Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers

Use approximations, inverse operations and tests of divisibility to estimate and check results

Calculating

Calculate mentally with integers and decimals U.t ± U.t, TU x U, TU ÷ U, U.t x U, U.t ÷ U

Demonstrate efficient use of written methods to add and subtract integers and decimals

Demonstrate ability to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three digit integers by a two-digit integer

Relate fractions to multiplication and division (e.g. 6 ÷ 2 = ½ of 6 = 6 x ½); express a quotient as a fraction or decimal (e.g. 67 ÷ 5 = 13.4 or 13 2/5); find fractions and percentages of whole-number quantities (e.g. 5/8 of 96, 65% of £260)

Core learning in mathematics by year

Year 6

Most children learn to:

Understanding shape

Describe identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids

Make and draw shapes with increasing accuracy and apply knowledge of their properties

Visualise and show on grids of different types where a shape will be after reflection, after translations, or after rotation through 90^{o} or 180^{o} about its centre or one of its vertices

Use coordinates in the first quadrant to draw, locate and complete shapes that meet given properties

Estimate angles and use a protractor to measure and draw them, on their own and in shapes; calculate angles in a triangle or around a point

Measuring

Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)

Read and interpret scales on a range of measuring instruments,

Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares

Handling Data

Describe and predict outcomes from data using the language of chance or likelihood

Solve problems by selecting, processing, presenting and interpreting data

Interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts

Describe and interpret results and solutions to problems using the mode, range, median and mean

Core learning in mathematics by year

Year 6 progression to Year 7

Most children learn to:

Using and applying mathematics

Solve problems by breaking down complex calculations into simpler steps; choose and use operations and calculation strategies appropriate to the numbers and context; present interpret and compare solutions

Represent information or unknown numbers in a problem, for example in a table, formula or equation; explain solutions in the context of the problem

Generate sequences and describe the general term; use letters and symbols to represent unknown numbers or variables; represent simple relationships as graphs

Explain and justify reasoning and conclusions using notation, symbols and diagrams; find a counter-example to disprove a conjecture; use step-by-step deductions to solve problems involving shapes

Counting and understanding number

Compare and order integers and decimals in different contexts

Order a set of fractions by converting them to decimals

Recognise approximate proportions of a whole and use fraction and percentages to describe and compare them, for example when interpreting pie charts

Use ratio notation, reduce a ratio to its simplest form and divide a quantity into two parts in a given ratio; solve simple problems involving ratio and direct proportion (e.g. identify the quantities needed to make a fruit drink by mixing water and juice in a given ratio)

Knowing and using number facts

Consolidate rapid recall of number facts, including multiplication facts to 10 x 10 and the associated division facts

Recognise the square roots of perfect squares to 12 x 12

Recognise and use multiples, factors, divisors, common factors, highest common factors and lowest common multiples in simple cases

Make estimates and approximations to calculations

Calculating

Understand how the commutative, associative and distributive laws, and the relationships between operations, including inverse operations, can be used to calculate more efficiently; use the order of operations, including brackets

Consolidate and extend mental methods of calculation to include decimals, fractions and percentages

Use standard column procedures to add and subtract integers and decimals

Use columns to multiply two-digit and three-digit integers by a one-digit or two-digit integer; extend division to dividing three-digit integers by a two-digit integer

Calculate percentage increases or decreases and fractions of quantities and measurements (integer answers)

Core learning in mathematics by year

Year 6 progression to Year 7

Most children learn to:

Understanding shape

Use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes

Extend knowledge of properties of triangles and quadrilaterals and use these to visualise and solve problems, explaining reasoning with diagrams

Know the sum of angles on a straight line, in a triangle and at a point, and recognise vertically opposite angles

Use all four quadrants to find coordinates of points determined by geometric information

Identify all the symmetries of 2-D shapes, transform images

Measuring

Convert between related metric units using decimals to three places (e.g. convert 1375 mm to 1.375 m or visa versa)

Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use

Calculate the area of right-angled triangles given the length of the two perpendicular sides, and the volume and surface area of cubes and cuboids

Handling Data

Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts

Interpret and compare graphs and diagrams that represent data, for example compare proportions in two pie charts that represent different totals

Core learning in mathematics by strand

Using and applying mathematics

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Use developing mathematical ideas and methods to solve practical problems. Match sets of objects to numerals that represent the number of objects. Sort objects, making choices and justifying decisions Recreate simple patterns	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change' Describe a puzzle or problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution in the original context Answer a question by sorting information, shapes or objects; display results using tables and pictures. In simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers measures or pounds and pence Identify and record the information or calculation needed to solve a puzzle or problem; carry out the steps or calculations Follow a line of enquiry; answer questions selecting, organising and presenting information in lists, tables and simple diagrams Describe patterns and relationships involving numbers or shapes, make predictions. Present solutions to puzzles and problems in an organised way	Solve one-step and two-step problems involving numbers, money or measures, including time, choosing and carrying out appropriate calculations Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context where appropriate using £.p notation or units of measure Follow a line of enquiry by deciding what information is important; make and use lists tables and graphs to organise and interpret the information. Identify patterns and relationships involving numbers or shapes, and use these to solve problems

Core learning in mathematics by strand

Using and applying mathematics

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to year 7
Solve one-step and two-step problems involving numbers, money or measures, including time; choose and carry out appropriate calculations, using calculator methods where appropriate Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in context of the problem Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers	Solve one-step and two-step problems involving whole numbers and decimals and all four operations, choosing and using appropriate calculation strategies Represent a puzzle of problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false	Solve multi-step problems, and problems involving fractions, decimals and percentages; choose and use appropriate calculation strategies at each stage Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy Represent and interpret sequences, patterns and relationships involving numbers and shapes; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence) Explain reasoning and conclusions, using words symbols or diagrams as appropriate	Solve problems by breaking down complex calculations into simpler steps; choose and use operations and calculation strategies appropriate to the numbers and context; present interpret and compare solutions Represent information or unknown numbers in a problem, for example in a table, formula or equation; explain solutions in the context of the problem Generate sequences and describe the general term; use letters and symbols to represent unknown numbers or variables; represent simple relationships as graphs Explain and justify reasoning and conclusions using notation, symbols and diagrams; find a counter-example to disprove a conjecture; use step-by-step deductions to solve problems involving shapes

Core learning in mathematics by strand

Counting and understanding number

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Use number names in order in familiar contexts Know that numbers identify how many objects are in a set **Count reliably up to 10 everyday objects** Count in ones, twos, fives, or tens **Use language such as 'more' and 'less' to compare two numbers** Use ordinal numbers in different contexts **Recognise numerals 1 to 9**	Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same Compare and order numbers, using the related vocabulary; use the equals (=) sign **Read and write numerals from 0 to 20, then beyond, use knowledge of place value to position these numbers on a number track and number line** Say the number that is 1 more or less than any given number and 10 more or less for multiples of 10	Read and type two digit and three digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers **Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two-digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of 10 and 1.** Order two-digit numbers and position them on a number line; use the greater than (>) and less than (<) signs Find one half, one quarter and three quarters of shapes and sets of objects	Read and type and order whole numbers to at least 1000 position them on a number line; count on from and back to zero in single-digit steps or multiples of 10 Partition three-digit numbers into multiples of 100, 10 and 1 in different ways Round two digit or three digit numbers to the nearest 10 or 100 and give estimates for their sums and differences Read and write proper fractions (e.g. $^{3}/_{7}$, $^{8}/_{9}$), interpreting the denominator as the parts of a whole and the numerator as the number of parts; identify and estimate fractions of shapes; use diagrams to compare fractions and establish equivalents.

Core learning in mathematics by strand

Counting and understanding number

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to Year 7
Recognise and continue number sequences formed by counting on or back in steps of constant size Partition, round and order four-digit whole numbers; use positive and negative numbers in context and position them on a number line. Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths **Use diagrams to identify equivalent fractions (e.g. $^{6}/_{8}$ and $^{3}/_{4}$, or $^{70}/_{100}$ and $^{7}/_{10}$); interpret mixed numbers and position them on a number line (e.g. 3 ½)** Use vocabulary of ratio and proportion to describe the relationship between two quantities (e.g. 'There are 2 red beads to every 3 blue beads or 2 beads in every 5 beads are red'); estimate a proportion (e.g. 'About one quarter of the apples in the bow are green')	Count from any given number in whole-number and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line **Explain what each digit represents in whole numbers and decimals with up to two decimal places, and partition, round and order these numbers** Express a smaller whole number as a fraction of a larger one (e.g. recognise that 5 out of 8 is 5/8); find equivalent fractions (e.g. 7/10 = 14/20, or 19/10 = 1 9/10); relate fractions to their decimal representations Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages Understand sequences to scale numbers up or down; solve problems involving proportions of quantities (e.g. decrease quantities in a recipe designed to feed six people)	Find the difference between a positive and a negative integer, or two negative integers, in context Use decimal notation for tenths, hundredths and thousands; partition, round and order decimals with up to three places, and position them on the number line. Express a larger whole number as a fraction of a smaller one (e.g. recognise that 8 slices of a 5-slice pizza represents $^{8}/_{5}$ or 1 $^{3}/_{5}$ pizzas); simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator Express one quantity as a percentage of another (e.g. express £400 as a percentage of £1000); find equivalent percentages, decimals and fractions Solve simple problems involving direct proportion by scaling quantities up or down	Compare and order integers and decimals in different contexts Order a set of fractions by converting them to decimals Recognise approximate proportions of a whole and use fraction and percentages to describe and compare them, for example when interpreting pie charts **Use ratio notation, reduce a ratio to its simplest form and divide a quantity into two parts in a given ratio; solve simple problems involving ratio and direct proportion (e.g. identify the quantities needed to make a fruit drink by mixing water and juice in a given ratio)**

Core learning in mathematics by strand

Knowing and using number facts

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Observe number relationships and patterns in the environment and use these to derive facts **Find one more or one less than a number from 1 to 10** Select two groups of objects to make a given total of objects	**Derive and recall all pairs of numbers with a total of 10 and addition facts for totals to at least 5; work out the corresponding subtraction facts** Count on or back in ones, twos, fives and tens and use this knowledge to derive the multiples of 2, 5, and 10 to the tenth multiple Recall the doubles of all numbers to at least 10	**Derive and recall all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals up to 100** Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves Derive and recall multiplication facts for the 2, 5 and 10 times-tables and relate division facts; recognise multiples of 2, 5, and 10 Use knowledge of number facts and operations to estimate and check answers to calculations	**Derive and recall all addition and subtraction facts for each number to 20, sums and differences of multiples of 10 and number pairs that total 100** Derive and recall multiplication facts for the 2, 3, 4, 5, 6, and 10 times tables and the corresponding division facts; recognise multiples of 2, 5, or 10 up to 1000 Use knowledge of number operations and corresponding inverses, including doubling and halving, to estimate and check calculations

Core learning in mathematics by strand

Knowing and using number facts

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to Year 7
Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000 Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves Derive and recall multiplication 10 x 10, the corresponding division facts and multiples of numbers to 10 up to the tenth multiple Use knowledge of rounding, number operations and inverse to estimate Identify pairs of fractions that total 1	**Use knowledge of place value and addition and subtraction of two-digit numbers to derive sums and differences and doubles and halves of decimals (e.g. 6.5 ± 2.7, half of 5.6, double 0.34)** Recall quickly multiplication facts up to 10 x 10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts Identify pairs of factors of two-digit whole numbers and find common multiples (e.g. for 6 and 9) Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations	**Use knowledge of place value and multiplication facts to 10 x 10 to derive related multiplication and division facts involving decimals (e.g. 0.8 x 7, 4.8 ÷ 6)** Use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12 and the corresponding squares of multiples of 10 Recognise that prime numbers have only two factors and identify prime numbers less than 100; find the prime factors of two-digit numbers Use approximations, inverse operations and tests of divisibility to estimate and check results	Consolidate rapid recall of number facts, including multiplication facts to 10 x 10 and the associated division facts Recognise the square roots of perfect squares to 12 x 12 Recognise and use multiples, factors, divisors, common factors, highest common factors and lowest common multiples in simple cases **Make estimates and approximations to calculations**

Core learning in mathematics by strand

Calculating

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Begin to relate addition to combining two groups of objects and subtraction to 'taking away' Count repeated groups of the same size. Share objects into equal groups and count how many in each group.	Relate addition to counting on; recognise that addition can be done in order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two digit number Understand subtraction as 'take away' and find 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number **Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences** Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups	**Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical mental methods to add and subtract two-digit numbers** Understand that subtraction is the inverse of addition and vice versa; use this to derive and record related addition and subtraction number sentences. Represent repeated addition and arrays as multiplication, and sharing (grouping) as division; use practical methods and related vocabulary to support multiplication and division, including calculations with remainders **Use the symbols +, -, x, ÷ and = record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence (e.g. ☐ ÷ 2 = 6, 30-☐=24)**	**Add or subtract mentally combinations of one-digit and two-digit numbers** Develop and use written methods to record and support addition and subtraction of two-digit and three-digit numbers Multiply one-digit and two-digit numbers by 10 or 100, and describe the effect Use practical and mental methods to multiply and divide two-digit numbers (e.g. 13 x 3, 50 ÷ 4); round remainders up or down, depending on the context Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences Find unit fractions of numbers and quantities (e.g. $^1/_2$, $^1/_3$, ¼ and $^1/_6$ of 12 litres)

Core learning in mathematics by strand

Calculating

Most children learn to:

Year 4

Add or subtract mentally pairs of two-digit whole numbers (e.g. 47 + 58, 91 – 35)

Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p

Multiply and divide numbers to 1000 by 10 and the 100 (whole-numbered answers), understanding the effect

Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 x 9, 98 ÷ 6)

Find fractions of numbers, quantities or shapes (e.g. $^1/_5$ of 30 plums)

Year 5

Extend mental methods for whole-number calculations, for example to multiply a two-digit by a one-digit number (e.g. 12 x 9), to multiply by 25 (e.g. 16 x 25), to subtract one near-multiple of 1000 from another (e.g. 6070 – 4097)

Use efficient written methods to add and subtract whole numbers and decimals with up to two places

Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000

Refine and use efficient mental methods to multiply and divide HTU x U, TU x TU, U.t x U and HTU ÷ U

Find fractions using division (e.g. 1/1000 of 5 kg), and percentages of numbers and quantities (e.g. 10%, 5% and 15% of £80)

Year 6

Calculate mentally with integers and decimals U.t ± U.t, TU x U, TU ÷ U, U.t x U, U.t ÷ U

Demonstrate efficient use of written methods to add and subtract integers and decimals

Demonstrate ability to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three digit integers by a two-digit integer

Relate fractions to multiplication and division (e.g. 6 ÷ 2 = ½ of 6 = 6 x ½); express a quotient as a fraction or decimal (e.g. 67 ÷ 5 = 13.4 or 13 2/5); find fractions and percentages of whole-number quantities (e.g. 5/8 of 96, 65% of £260)

Year 6 progression to Year 7

Understand how the commutative, associative and distributive laws, and the relationships between operations, including inverse operations, can be used to calculate more efficiently; use the order of operations, including brackets

Consolidate and extend mental methods of calculation to include decimals, fractions and percentages

Use standard column procedures to add and subtract integers and decimals

Use columns to multiply two-digit and three-digit integers by a one-digit or two-digit integer; extend division to dividing three-digit integers by a two-digit integer

Calculate percentage increases or decreases and fractions of quantities and measurements (integer answers)

Core learning in mathematics by strand

Understanding shape

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Use familiar objects and common shapes to create and recreate patterns and build models **Use language such as 'circle' or 'bigger' to describe the shape and size and of solids and flat shapes** **Use everyday words to describe position**	**Visualise and name common 2-D shapes and 3-D solids and describe there features; use them to make patterns, pictures and models** Identify objects that turn about a point (e.g. scissors) or about a line (e.g. door); recognise and make whole, half and quarter turns Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board (grid)	**Visualise common 2-D and 3-D shapes and 3-D solids; identify shapes from pictures of them in different positions and orientations; sort and describe shapes referring to their properties** Identify reflective symmetry in patterns and 2-D shapes and place lines of symmetry on the shapes Follow and give instructions involving position, direction and movement Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn	Relate 2_D shapes and 3-D solids to drawings of them; describe, visualise, classify the shapes. **Complete shapes with reflective symmetry; select and place the reflection of a shape in a mirror line long one side.** Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid Compare angles with a right angle, recognise that a straight line is equivalent to two right angles.

Core learning in mathematics by strand

Understanding shape

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to Year 7
Draw polygons and classify them by their properties, including their line symmetry	Identify, visualise and describe the properties of rectangles, triangles, regular polygons and 3-D solids; use knowledge of properties to identify 2-D shapes and to identify nets of 3-D shapes	Describe identify and visualise parallel and perpendicular edges or faces; use these properties to classify 2-D shapes and 3-D solids	Use correctly the vocabulary, notation and labelling conventions for lines, angles and shapes
Visualise 3-D objects from 2-D drawings; make nets of common solids	**Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes**	Make and draw shapes with increasing accuracy and apply knowledge of their properties	Extend knowledge of properties of triangles and quadrilaterals and use these to visualise and solve problems, explaining reasoning with diagrams
Recognise horizontal and vertical lines; use the eight compass points to describe direction and identify the position of a square on a grid of squares	Complete patterns with up to two lines of symmetry; show the position and orientation of the shape after reflection or translation	**Visualise and show on grids of different types where a shape will be after reflection, after translations, or after rotation through 90^o or 180^o about its centre or one of its vertices**	**Know the sum of angles on a straight line, in a triangle and at a point, and recognise vertically opposite angles**
Know that angles are measured in degrees and that one whole turn is 360^o; compare and order angles less than 180^o	Calculate angles in a straight line	Use coordinates in the first quadrant to draw, locate and complete shapes that meet given properties	Use all four quadrants to find coordinates of points determined by geometric information
		Estimate angles and use a protractor to measure and draw them, on their own and in shapes; calculate angles in a triangle or around a point	Identify all the symmetries of 2-D shapes, transform images

Core learning in mathematics by strand

Measuring

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Use language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities Use everyday language relate to time; order and sequence familiar events short periods of time	Estimate the size or weight of objects, using suitable non-standard or standard measurements, compare objects. Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour.	Estimate and compare lengths, weights and capacities choosing and using standard units and identify suitable measuring instruments. Compare lengths with a virtual ruler. Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15, and 20 numbered) **Use units of time (seconds, minutes, hours, days) and know the relationship between them; read the time to the quarter hour; identify time intervals, including those that cross the hour**	Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy Read the time on a 12 hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval

Core learning in mathematics by strand

Measuring

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to Year 7
Choose and use standard metric units and their abbreviations when estimating and recording length, weight and capacity; know the meaning of 'kilo', 'centi', and 'milli' and where appropriate, use decimal notation to record measurements (e.g. 1.3 m or 0.6 kg) Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit Consider rectangles, calculate their perimeters; find the area of rectilinear shapes drawn on a square grid by counting squares Read time to the nearest minute; use am, pm and 12-hour clock notation; chose units of time to measure time intervals; calculate time intervals from clocks and timetables	Read, choose, use and record standard metric units to estimate and measure length, weight, capacity to a suitable degree of accuracy (e.g. the nearest centimetre); convert larger to smaller units using decimals to one place (e.g. change 2.6 kg to 2600kg) Interpret a reading that lies between two unnumbered divisions on a scale **Calculate the perimeter of regular and irregular polygons and use the formula for the area of a rectangle to calculate the rectangle's area.** Read timetables and time using 24-hour clock notation; use a calendar to calculate time intervals.	**Select and use standard metric units of measure and convert between units using decimals to two places (e.g. change 2.75 litres to 2750 ml, or vice versa)** Read and interpret scales on a range of measuring instruments, Calculate the perimeter and area of rectilinear shapes; estimate the area of an irregular shape by counting squares	Convert between related metric units using decimals to three places (e.g. convert 1375 mm to 1.375 m or visa versa) **Solve problems by measuring, estimating and calculating; measure and calculate using imperial units still in everyday use** Calculate the area of right-angled triangles given the length of the two perpendicular sides, and the volume and surface area of cubes and cuboids

Core learning in mathematics by strand

Handling Data

Most children learn to:

Foundation Stage	Year 1	Year 2	Year 3
Sort familiar objects to identify their similarities and differences Count how many objects share a particular property, presenting results using pictures, drawings or numerals	**Answer a question, recording information in lists and tables** Use diagrams to sort objects into groups according to a given criterion	**Use lists, tables and diagrams to sort objects; sort using appropriate language, including 'not'**	Answer a question by organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations. **Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion**

Core learning in mathematics by strand

Handling Data

Most children learn to:

Year 4	Year 5	Year 6	Year 6 progression to Year 7
Answer a question by identifying what data to collect, organise, present, analyse and interpret the data in tables, diagrams, tally charts, pictograms and bar charts	Describe the occurrence of familiar events using the language of chance or likelihood Answer a set of related questions by collecting selecting and organising relevant data; draw conclusions Find and interpret the mode of a set of data	Describe and predict outcomes from data using the language of chance or likelihood Solve problems by selecting, processing, presenting and interpreting data Interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts Describe and interpret results and solutions to problems using the mode, range, median and mean	**Understand and use the probability scale from 0 to 1; find and justify probabilities based on equally likely outcomes in simple contexts** Interpret and compare graphs and diagrams that represent data, for example compare proportions in two pie charts that represent different totals