Maths

At Caldecote, we aim to create independent, confident and resilient mathematicians who are well equipped to apply their knowledge to other school subjects, the wider world and their lives in the future. We will continually revisit and consolidate knowledge to ensure our pupils have a secure and deep understanding and the ability to make connections between mathematical ideas. As Caldecote pupils progress, they will become increasingly fluent in the fundamentals of maths, be able to reason mathematically and be able to solve progressively complex problems.

Our maths teaching is structured around:

- ✓ **Daily:** times tables and arithmetic
- ✓ **Every Lesson:** problem solving and reasoning
- ✓ **Termly Revisit:** number and place value, addition and subtraction, multiplication and division, fractions and decimals
- ✓ **All Year Groups:** Concrete – Pictorial – Abstract

Planning to Teach Maths

Caldecote Curriculum

- Caldecote Curriculum to be followed for objectives.
- Use Caldecote maths planning template.
- Refer to the agreed calculation strategies.

NCETM

- Use for professional development and guidance on small steps, vocabulary and stem sentences
- Use slides (where necessary) and questions provided for pupils

Supplement

- White Rose
- I See Reasoning
- I See Problem Solving
- Fluent in Five
- Nrich
- Headstart (for arithmetic)
- Ready to Progress (government non-statutory guidance)
- Can supplement with other useful resources

Assessment

- White Rose Arithmetic
- Assertive Mentoring
- Maths Frame Times Table Check

Reception Overview

Number and numerical patterns	• Count beyond 20 • Deep understanding of the numbers to 10 • Relationships between and patterns within numbers to 10 • Manipulatives for organising counting • Subitise up to 5 • Compare numbers • Compare groups of objects • Number bonds to 10 and related subtraction facts • Doubles and halves to 10 • Writing numerals to 0 –10 • + - = symbols • Estimation • Count in 2s • Grouping and sharing		**Shape, space, measure and pattern**	• Spatial reasoning • 2D shapes including triangles • Repeating patterns • Position and direction • Time: today, tomorrow, yesterday • Order a short sequence of events • Measures: weight, length, capacity • Comparing quantities: numerical and objects	**Calculation** **Pupils learn these strategies and use these resources for calculation in YR** • Concrete and pictorial representations of adding and subtracting 2 single digit numbers • Partitioning including using a part-part whole • Recording: use marks that they can interpret • Introduce + - = in simple number sentences • Number lines – count on and back • Five frame & Ten frame • Grouping and sharing with objects and pictures **Number Bond Strategies** • One more, one less • Two more, two less • Number 10 fact families • Five and a bit

Our youngest mathematicians should….			
	Autumn	**Spring**	**Summer**
Number	• Subitise (recognise quantities without counting) up to 3 • Count objects, actions and sounds • Link the number symbol (numeral) with it's cardinal number value • Write numerals 0-5 • Recognise 1p, 2p and 5p	• Compare numbers using vocabulary including 'more than', 'less than', 'fewer', 'the same as' and 'equal to' • Can identify 1 more or 1 less than number to 10 • Recognise and use + - = symbols • Recognise and use part part whole • Use language related to addition: addend, sum/total • Use language related to subtraction: minuend, subtrahend, difference • Distribute items equally e.g. put 3 cakes on each plate • Understand the 'one more than/one less than' relationship between consecutive numbers • Automatically recall some double facts to 10 • Write numerals 0-10 • Recognise 10p	• Have a deep understanding of number to 10, including the composition of each number • Subitise (recognise quantities without counting) up to 5; • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double and half facts. • Estimate how many objects are in a group • Automatically recall subtraction facts to 5 • Automatically recall some half facts • Introduce 'times' vocabulary i.e. jump 3 times, clap 5 times
Numerical Patterns	• Verbally count to 10	• Verbally count beyond 10 • Explore the composition of numbers to 10 • Explore number bonds for numbers 0-10 • Count in 2s up to 10 and understand this pattern • Understand grouping and sharing equally and represent these with manipulatives or pictures	• Verbally count beyond 20, recognising the pattern of the counting system • Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally
Spatial Awareness	• Select, rotate and manipulate shapes in order to develop spatial reasoning skills • Compose and decompose shapes recognising that shapes can have other shapes within them just as number can • Identify common 2D shapes: square, circle, triangle, rectangle • Describe the properties of these shapes: sides, corners, curved, straight	• Identify common 3D shapes: cube, sphere and cylinder • Show intentionality in selecting shapes for a purpose, such as cylinders to roll • Make a range of constructions, including enclosures and talk about the decision they have made • Explore, create and discuss maps of small and large areas • See shapes (both 2D and 3D) in different orientations and recognise that they are still that shape • Recognise a range of triangles and say how they know what they are • Explain whether a circular pattern is continuous or not • Use positional vocabulary, including relative terms, to describe where things are in small-world play; including 'under, on top, next to, behind, in front'	• Continue, copy and create repeating patterns (AB, ABB, ABBC) • Spot an error and 'correct' a pattern • Use vocabulary related to weight, length and capacity including: small, big, long, short, heavy, light, full, empty • Compare length, weight and capacity using comparative vocabulary: longer, shorter, heavier, lighter, bigger, smaller • Find an appropriate container for a specific item • Order a short sequence of events • Use and understand simple language related to time: day, week, year, days of the week, yesterday, today, tomorrow

In Reception, our <u>greater depth</u> mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Apply mathematical knowledge to different contexts including other areas of learning Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Subitise quickly and accurately Understand the relationships between numbers and different arrangements (such as odd numbers)
Logical reasoning (making an argument using facts and connections)	Justify the strategy they used and explain their reasoning Use accurate mathematical vocabulary
Strategic competence (apply the right strategy to find solutions)	Pupils will demonstrate different ways of solving problems Work backwards to solve a problem

Year 1 Overview

Number and place value	● Numbers to 10 ● Numbers to 20 ● Numbers up to 50 ● Numbers up to 100 ● 2 digit numbers; Tens and ones ● 0-20 in words ● Odd and even numbers	**Addition & subtraction**	● Addition and subtraction within 10 ● Addition and subtraction within 20	**Calculation** **Pupils learn these strategies and use these resources for calculation in Y1** ● Partitioning including using a part-part whole model ● + - x ÷ = used to record number sentences ● Ten frame ● Draw number lines – count on and back ● Tens and ones – partitioning to add ● Pictorial – subtraction by crossing out ● Multiplication as repeated addition – adding equal groups ● Grouping and sharing objects ● Arrays ● 100 square **Number Bond Strategies** ● One more, one less ● Two more, two less ● Number 10 fact families ● Five and a bit ● Ten and a bit (11-19)
Multiplication and Division	● 0 x tables ● 1 x tables ● 2 x tables ● 10 x tables ● Introduction to multiplication and division X ÷ ● Grouping and sharing ● Arrays	**Fractions**	● Introduction to fractions ● Introduction to halves and quarters ● Half and quarter of a shape and group of objects ● ½ and ¼ notation	
Measurement	● Introduction to time ● Introduction to length and height ● Introduction to coins and notes ● Introduction to mass ● Introduction to capacity and volume ● Sequencing events ● Dates, days of week, months and years	**Geometry**	● Recognising and naming 2D and 3D shapes ● Turns ● Left/right ● Ordinal numbers ● Positions: in front, above, etc	

Our Year 1 mathematicians should….

Autumn

Number and Place Value

- Count to 50, forward and backward, beginning with 0, or from any given number
- Read and write numbers to 20 in numerals
- Recognise the place value (tens and ones) of each digit in a 2 digit number within 20
- Identify 1 more or 1 less than within 20
- Read and write numbers from 1-10 in words
- Use the language of: equal to, more than, less than, most and least when comparing numbers
- Identify and represent numbers using objects and pictorial representations including the numberline

Addition and Subtraction

- Read, write and interpret equations containing +, - and = symbols and relate additive expressions and equations to real-life contexts
- Compose numbers to 10 from 2 parts and partition numbers to 10 into parts, including recognizing odd and even numbers
- Compare addition and subtraction statements

Multiplication and Division

- Begin to unitise e.g. 1 pot of 10 pencils, 1 mat of 4 pupils
- Count in multiples of 2 to 50

Fractions

- Recognise, find and name a half as one of two equal parts of an object or shape

Geometry

- Identify, name and describe common 2D shapes: square, circle, triangle, rectangle, pentagon, hexagon

Spring

Number and Place Value

- Count to 100, forward and backward, beginning with 0, or from any given number
- Read and write numbers to 50 in numerals
- Recognise the place value (tens and ones) of each digit in a 2 digit number to 50
- Identify 1 more or 1 less than within 50
- Read and write numbers from 1-20 in words and numerals
- Identify odd and even numbers
- Identify and represent numbers using objects and pictorial representations including the numberline

Addition and Subtraction

- Develop fluency in addition and subtraction facts within 10
- Solve one step problems involving addition and subtraction, using concrete objects and pictorial representations and missing number problems

Multiplication and Division

- Unitise by working with numbers as units or groups for 2 and 10 times table
- Count in multiples of 2s and 10s to 50
- Unitise 2s and 10s, understanding place value system
- Identify unit size and number of units e.g. 2 apples in a bag and there are 4 bags.

Fractions

- Recognise, find and name a half as one of two equal parts of an object, shape or quantity
- Recongise, find and name a quarter of an object

Measurement

- Compare, describe and solve practical problems for lengths and heights: non-standard units and cm
- Compare, describe and solve problems for mass: non-standard units
- Read a simple scale: ruler, weighing scale, measuring jug
- Compare, describe and solve problems for capacity and volume: non-standard unit

Geometry

- Identify and name common 3D shapes: cube, cuboid, sphere, cylinder, pyramid

Summer

Number and Place Value

- Count to and across 100, forward and backward, beginning with 0, or from any given number
- Read and write numbers to 100 in numerals
- Recognise the place value (tens and ones) of each digit in a 2 digit number to within 100
- Identify 1 more or 1 less than within 100
- Identify and represent numbers using objects and pictorial representations including the numberline

Addition and Subtraction

- Represent and use number bonds and related subtraction facts within 20
- Add and subtract 1-digit and 2-digit numbers to 20
- Solve one step problems involving addition and subtraction, using concrete objects and pictorial representations and missing number problems such as 7 = __ - 9

Multiplication and Division

- Unitise by working with numbers as units or groups for 0 and 1 times table
- Count in multiples of 2s, 5s and 10s to 100
- Demonstrate multiplicative reasoning for 2, 5 and 10 tables, grouping objects and connecting this to real-life scenarios.
- Solve one step problems involving multiplication and division, by calculating using concrete objects, pictorial representations and arrays

Fractions

- Recognise, find and name a quarter of an object or group of objects, shape or quantity

Position and Direction

- Describe position, direction and movement including half, quarter and three quarter turns, first, second, in-front, under, etc
- Identify right and left turns

Measurement

- Recognise and know the value of different denominations of coins and notes
- Sequence events in chronological order using language: before, after, today, yesterday, morning, etc
- Recognise and use language relating to dates, including days of the week, weeks, months and years
- Tell the time using o'clock and half past

In Year 1, our greater depth mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Apply mathematical knowledge to different contexts including other areas of learning Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Subitise quickly and accurately Understand the relationships between numbers and different arrangements (such as odd numbers)
Logical reasoning (making an argument using facts and connections)	Justify the strategy they used and explain their reasoning Demonstrating using a range of strategies and choosing the most efficient Use accurate mathematical vocabulary
Strategic competence (apply the right strategy to find solutions)	Pupils will demonstrate different ways of solving problems Work backwards to solve a problem

Year 2 Overview

Number and place value	● Compare and order 0-100 ● > < = ● 0-100 numerals and words	**Addition & subtraction**	● 2 digit addition and subtraction ● Adding 3 1-digit numbers ● Inverse	**Calculation** **Pupils learn these strategies and use these resources for calculation in Y2** ● Part, part whole model to partition ● Draw number lines ● Arrays ● 100 square ● Counting in multiples ● Inverse to check calculations ● Compensation ● Redistribution ● Repeated addition **Number Bond Strategies** ● One more, one less ● Two more, two less ● Number 10 fact families ● Five and a bit ● Ten and a bit ● Ten and then… ● Doubles and near doubles
Multiplication and Division	● 2 x tables ● 5 x tables ● 10 x tables ● 11 x tables ● 3 x tables ● 4 x tables ● Doubles ● Count in 2,3,5 and 10s ● Multiply 1 digit by 1 digit ● Divide 2 digit by 1 digit	**Geometry**	● Properties of 2D and 3D shapes ● Compare and sort shapes ● Rotation ● Order and arrange patterns and sequences ● Right angle turns ● Clockwise/ anticlockwise	
Measurement	● Units of length and height ● Exploring mass ● Understanding pounds and pence ● Telling the time, compare and sequence time ● Capacity, volume and temperature	**Fractions**	● Introduction to comparing, ordering and equivalent fractions ● Half and quarter of a number 0-50	
		Statistics	● Introduction to graphs ● Pictograms, tally charts, block diagrams and tables	

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Our Year 2 mathematicians should….

Autumn

Number and Place Value
- Count in steps of 2 and 5 from 0, and in tens from any given number, forward and backward
- Read and write numbers to 100 in numerals and words
- Compare and order numbers from 0 up to 50 and use < > and = signs
- Recognise the place value (tens and ones) of each digit in all 2 digit numbers

Addition and Subtraction
- Secure fluency in addition and subtraction facts within 10
- Add and subtract across 10
- Add and subtract within 100 by applying related one-digit and subtraction facts: add and subtraction only ones or only tens to/from a two-digit number and add three 1-digit numbers
- Know that addition of two numbers is commutative and subtraction is not

Multiplication and Division
- Demonstrate multiplicative reasoning for 2s, 11s, 10s, including recognising odd and even numbers
- Use x and ÷ symbols
- Unitise by working with numbers as units or groups. Use vocabulary of 'unit size' and 'number of units' when appropriate.
- Understand commutative law for multiplication

Fractions
- Recognise, find, name and write fractions of half, a quarter and a third of a shape or set of objects.

Geometry
- Identify and describe the properties of 2D shapes including the number of sides and lines of symmetry

Measurement
- Compare and order lengths and mass and record the results using > < =
- Compare and order volume/capacity and record the results using > < =
- Choose and use appropriate standard units to estimate and measure: length/height cm/m, mass kg/g, temperature ºC, capacity l/ml using rulers, scales, thermometers and measuring vessels

Spring

Number and Place Value
- Count in steps of 2 , 3 and 5 from 0, and in tens from any given number, forward
- Compare and order numbers from 0 up to 100 and use < > and = signs

Addition and Subtraction
- Recall and use addition and subtraction facts to 20 and derive related facts up to 100
- Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two-digit numbers
- Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems.

Multiplication and Division
- Demonstrate multiplicative reasoning for 2s, 5s, 4s, 10s 11s, using real-life examples
- Recognise that division is the inverse of multiplication and use this to check calculations

Fractions
- Recognise, find, name and write fractions of half, a quarter and a third of a shape, length, set of objects or quantity.
- Recognise, find, name and write fractions three quarters of a shape, set of objects or quantity.

Measurement
- Recognise and use symbols for pounds (£) and pence (p)
- Combine amounts of money to make particular values
- Solve simple problems in a practical context involving addition and subtraction of money of the same unit – including giving change

Geometry
- Identify and describe the properties of 3D shapes including the number of edges, vertices and faces
- Identify 2D shapes on the surface of 3D shapes

Summer

Number and Place Value
- Count in steps of 2 , 3 and 5 from 0, and in tens from any given number, forward and backward
- Compare and order numbers from 0 up to 100 and use < > and = signs

Addition and Subtraction
- Solve problems with addition and subtraction using concrete and pictorial representations, including those involving quantities and measures
- Apply their increasing knowledge of mental and written methods

Multiplication and Division
- Recall and use multiplication and division facts for the 2, 5, 10, 11, 3 and 4 times tables
- Use multiplicative reasoning to identify missing facts
- Solve one step problems involving multiplication and division (2,5,10,3 and 4 times tables) by calculating using concrete objects, pictorial representations and arrays

Fractions
- Write simple fractions e.g ½ of 6 = 3 and recognise the equivalence of 2/4 and ½

Position and Direction
- Use mathematical vocabulary to describe position, direction and movement, including movement in a straight line distinguishing between rotation as a turn and in terms of right angles for quarter, half and three quarter turns (clockwise and anti-clockwise)

Measurement
- Tell, draw (the hands) and write the time: quarter to and quarter past the hour, and all times to 5 minutes
- Compare and sequence intervals of time

Statistics
- Interpret and construct pictograms, tally charts, block diagrams and simple tables
- 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 totaling and compare categorical data

Geometry
- Order and arrange combinations of mathematical objects in patterns and sequences

In Year 2, our greater depth mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Apply mathematical knowledge to different contexts including other areas of learning Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Subitise quickly and accurately Understand the relationships between numbers and different arrangements (such as odd numbers)
Logical reasoning (making an argument using facts and connections)	Justify the strategy they used and explain their reasoning Demonstrating using a range of strategies and choosing the most efficient Use accurate mathematical vocabulary
Strategic competence (apply the right strategy to find solutions)	Pupils will demonstrate different ways of solving problems Work backwards to solve a problem

Year 3 Overview

Number and place value	● 3 digit numbers ● Roman numerals I to XII ● Compare and order 0- 1000 ● 0-1000 numerals and words	**Addition & subtraction**	● Three-digit addition and subtraction	**Calculation** **Pupils learn these strategies and choose the most efficient methods for their calculation in Y3** ● Partitioning (relates to all four operations) ● Compensation ● Redistribution ● Making connections between numbers ● Column addition and subtraction after ensuring mental strategies are in place and secure ● Bar modelling ● Grid method ● Repeated addition ● Arrays ● Repeated subtraction ● Estimation and inverse to check calculations
Multiplication and Division	● 2 x tables ● 5 x tables ● 10 x tables ● 11 x tables ● 3 x tables ● 4 x tables ● 12 x tables ● 6 x tables ● 8 x tables ● Square numbers ● Count in 3s, 4s, 8s, 50s and 100s ● Multiply 2 digit by 1 digit number ● Divide 2 digit by 1 digit number	**Fractions and decimals**	● Introduction to adding and subtracting fractions ● Tenths	
Measurement	● Add and subtract money ● Length and perimeter ● Analogue and digital time ● Compare durations ● Angles ● Length, weight, capacity and volume – add, subtract and compare	**Geometry**	● Draw and make 2D and 3D shapes ● Recognise angles in shapes ● Horizontal and vertical lines ● Perpendicular and parallel lines ● Right angle = quarter turn ● Half, three quarter and whole turn	
		Statistics	● Interpret and present data using bar charts, pictograms and tables	

Our Year 3 mathematicians should….

Autumn

Number and Place Value
- Count from 0 in multiples of 4, 50 and 100
- Find 10 or 100 more or less than any given number
- Recognise the place value (ones, tens and hundreds) of each digit in a 3-digit number

Addition and Subtraction
- Add and subtract numbers mentally using their number bond knowledge
- Add and subtract numbers mentally including: 3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds.
- Add and subtract numbers with up to 3-digits using formal written column methods
- Use the inverse to check calculations

Multiplication and Division
- Recall and use multiplication and division facts for the 2, 3, 5, 10, 11 and 12 tables

Fractions
- Recognise unit and non-unit fractions
- Compare and order unit fractions, and fractions with the same denominators
- Add and subtract fractions with the same denominator within one whole

Geometry
- Make 3D shapes using modelling materials
- Recognise 3D shapes in different orientations and describe them

Spring

Number and Place Value
- Count from 0 in multiples of 4,8, 50 and 100
- Compare and order numbers to 1000

Addition and Subtraction
- Add and subtract numbers mentally using compensation and redistribution
- Add and subtract measures (length, mass, volume, money) with up to 3-digits using formal column methods

Multiplication and Division
- Recall and use multiplication and division facts for the 4 and 8 tables
- Write and calculate multiplication and division problems mentally using known X Tables and using formal methods, including 2-digit X 1-digit

Fractions
- Recognise, find and write fractions of a discrete set of objects; unit fractions and non-unit fractions
- Recognise and show, using diagrams, equivalent fractions with small denominators

Measurement
- Measure the perimeter of simple 2D shapes
- Add and subtract amounts of money to give change, using both £ and p in practical contexts

Statistics
- Interpret and present data using bar charts, pictograms and tables
- Solve 1-step and 2-step questions such as: 'How many more? How many fewer?' using information presented in scaled bar charts, pictograms and other graphs.

Geometry
- Draw 2D shapes
- Recognise angles are a property of shape or a description of a turn

Summer

Number and Place Value
- Read and write numbers to 1000 in numerals and words

Addition and Subtraction
- Solve word problems including missing number problems, number facts, place value and more complex addition and subtraction

Multiplication and Division
- Calculate multiplication and division problems including use of money and length

Fractions
- Count up and down in tenths and recognise that tenths arise from dividing an object, number or quantity into ten equal parts

Geometry
- Identify right angles, recognise that two right angles make a half turn, three make three quarters 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

Measurement
- Estimate and read time to the nearest minute
- Tell and write the time on an analogue clock including Roman numerals from I to XII
- Measure, compare, add and subtract lengths (m,cm,mm), mass (kg,g), volume/capacity (l,ml)
- Read 12 hour and 24 hour clocks
- Record and compare time – seconds, minutes and hours
- Use vocabulary such as o'clock, am/pm, 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 – calculate the time taken by particular events or tasks

In Year 3, our <u>greater depth</u> mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Understand and apply increasingly complex concepts and relationships Firmly established fluency in remembering facts and relationships
Logical reasoning (making an argument using facts and connections)	Demonstrate relationships between and within concepts Work systematically to prove all possible solutions to a problem Explain and justify mathematical solutions or strategies
Strategic competence (apply the right strategy to find solutions)	Use a range of strategies to efficiently solve problems Work backwards to solve a problem

Year 4 Overview

Number and place value	• 4 digit numbers • Introduction to negative numbers • Roman numerals to 100 (C) • Numbers beyond 1000 • Rounding numbers	**Addition & subtraction**	• Four-digit addition and subtraction	**Calculation** **Pupils learn these strategies and choose the most efficient methods for their calculation in Y4** • Partitioning (relates to all four operations) • Compensation • Redistribution • Making connections between numbers • Column addition and subtraction • Bar modelling • Short multiplication after exploring the structure through partitioning or repeated addition • Arrays • Repeated subtraction with remainders • Partitioning leading onto short division • Estimation and inverse to check calculations
Multiplication and Division	• All X tables • Count in 6s, 7s, 9s, 25s and 1,000s • Factor pairs • Multiply 3 digit by 1 digit number • Divide 3 digit by 1 digit number including remainders	**Fractions and decimals**	• Common equivalent fractions • Add and subtract fractions with the same denominator • Introduction to decimals • Hundredths • Rounding decimals • Comparing decimal numbers	
Measurement	• Area of rectilinear shapes by counting squares • Converting between units of measure • Solving problems involving money • Converting between different units of time – 12hr and 24hr • Comparing angles • Perimeter of rectilinear shapes	**Geometry**	• Compare and classify (including congruence) geometric shapes (including quadrilaterals, triangles, trapeziums and rhombus) • Acute and obtuse angles • Lines of symmetry in 2D shapes • Coordinates in the first quadrant • Translations	
		Statistics	• Discrete and continuous data • Bar charts, time graphs and tables	

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Our Year 4 mathematicians should….

Autumn

Number and Place Value
- Count backwards through zero to include negative numbers
- Count in multiples of 6, 7, 25 and 1000
- Find 1000 more or less than any given number

Addition and Subtraction
- Use both mental methods to add and subtract increasingly large numbers using knowledge of their number facts, compensation and redistribution
- Add and subtract 4-digit numbers using formal column methods **where appropriate**

Multiplication and Division
- Recall and use multiplication and division facts for the 2, 3, 4, 5, 8 and 10 tables
- Use place value, known and derived facts to multiply and divide mentally by 10, 100, 1 and 0.

Fractions
- Recognise and show, using diagrams, families of common equivalent fractions
- Add and subtract fractions with the same denominator

Geometry
- Compare and classify (including congruence) geometric shapes, including quadrilaterals, triangles, trapeziums and rhombus based on their properties and sizes.

Measurement
- Measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m
- Find the area of rectilinear shapes by counting squares
- Convert between different units of measure (km to m)

Spring

Number and Place Value
- Count in multiples of 6, 9, 7, 25 and 1000
- Compare and order numbers beyond 1000

Addition and Subtraction
- Estimate and use inverse to check answers to calculations
- Recognise the most efficient methods

Multiplication and Division
- Recall and use multiplication and division facts for the 3 and 6 tables
- Recognise and use factor pairs and commutativity in mental calculations
- Use place value, known and derived facts to multiply and divide mentally, including multiplying by 0 and 1 and multiplying three numbers together
- Find the effect of multiplying a number with up to 2 decimal places by 10 and 100, identifying the value of the digits in the answer as ones, tenth and hundredths.

Fractions and Decimals
- Divide a 1-digit or 2-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- Count up and down in hundredths and recognise that hunderedths arise from dividing an object, number or quantity into 100 equal parts
- Recognise and write decimal equivalents of any number of tenths or hundredths

Statistics
- Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

Geometry
- Complete a simple symmetric figure with respect to a specific line of symmetry
- Identify acute and obtuse angles and compare and order angles up to two right angles by size

Summer

Number and Place Value
- Read Roman numerals to 100
- Round numbers to the nearest 10, 100 or 1000

Addition and Subtraction
- Solve addition and subtraction two step problems in a variety of contexts deciding which operations and methods to use and why.

Multiplication and Division
- Recall multiplication and division facts for multiplication tables up to X12
- Multiply 2-digit and 3-digit numbers by 1-digit numbers using formal written method
- Divide 2-digit and 3-digit numbers by a 1-digit number using formal written method beginning to use remainders

Fractions and Decimals
- Round decimals with one decimal place to the nearest whole number
- Recognise and write decimal equivalents to ¼, ½ and ¾
- Compare numbers with the same number of decimal places up to two decimal places.

Geometry
- Describe positions on a 2D grid as coordinates in the first quadrant
- Identify lines of symmetry in 2D shapes presented in different orientations
- Describe movements between positions as translations of a given unit to the left/right/up/down
- Plot specified points and draw sides to complete a given polygon

Measurement
- Read and write and convert between analogue and digital 12 and 24 hour clocks
- Convert between different units of measure (hour to min)
- Compare durations of events – calculate the time taken by particular events or tasks

In Year 4, our greater depth mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Understand and apply increasingly complex concepts and relationships Firmly established fluency in remembering facts and relationships
Logical reasoning (making an argument using facts and connections)	Demonstrate relationships between and within concepts Work systematically to prove all possible solutions to a problem Explain and justify mathematical solutions or strategies
Strategic competence (apply the right strategy to find solutions)	Use a range of strategies to efficiently solve problems Work backwards to solve a problem

Year 5 Overview

Number and place value	● Numbers to at least a million ● Negative numbers ● Roman numerals to 1,000 (M) ● Rounding
Multiplication and Division	● All X tables ● Count in 10s, 100s, 1000s... ● Combining addition, subtraction, multiplication and division ● Factors, multiples, prime numbers, prime factors and composite numbers ● Square² numbers ● Cube³ numbers ● Multiply 4 digit by 1 or 2 digit numbers ● Divide 4 digit by 1 digit including remainders
Measurement	● Converting metric and simple imperial units ● Further converting between units of time ● Perimeter and area ● Exploring capacity and volume ● Use approximate equivalences and estimation
Statistics	● Line graphs and tables and timetables

Addition & subtraction	● Addition and subtraction of numbers with more than 4 digits ● Four operations with decimals
Fractions and decimals	● Compare, order and simplify fractions ● Compare, order and find equivalent fractions ● Introduction to adding and subtracting fractions with different denominations ● Multiply proper fractions and mixed numbers by whole numbers ● Rates and scaling by fractions ● Introduction to Percentages ● Thousandths
Geometry	● Exploring 2D representations of 3D shapes ● Drawing, measuring, comparing and finding angles ● Acute, obtuse and reflex angles ● Angles around a point 360º and on a straight line 180º ● Regular and irregular polygons ● Reflection and translation ● Coordinates in 2 quadrants

Calculation

Pupils consolidate these strategies and choose the most efficient methods for their calculation in Y5

- Partitioning (relates to all four operations)
- Compensation
- Redistribution
- Making connections between numbers
- Column addition and subtraction
- Bar modelling
- Long multiplication
- Short division
- Rounding, estimation and inverse to check calculations

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Our Year 5 mathematicians should….

Autumn

Number and Place Value
- Count forward and backwards in steps of powers of 10 for any given number up to 1,000
- Interpret negative numbers in context, count forwards and backwards with positive and negative numbers, including through zero
- Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit

Addition and Subtraction
- Add and subtract numbers mentally with increasingly large numbers
- Add and subtract whole numbers with more than 4 digits, including using formal column methods

Multiplication and Division
- Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- Recognise and use square and cube numbers and use notation squared² and cubed³
- Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers and establish whether a number up to 100 is prime and recall prime numbers to 19
- Solve problems involving multiplication and division using knowledge of factors and multiples, squares and cubes
- Multiply and divide whole numbers and those involving decimals by 10,100 and 1000

Fractions
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number
- Compare and order fractions whose denominators are all multiples of the same number

Measurement
- Measure and calculate the perimeter of composite rectilinear shapes in cm and m
- Calculate and compare the area of rectilinear (including squares), and including using standard units, square cm (cm²) and square m (m²) and estimate the area of irregular shapes

Geometry
- 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
- Use the properties of rectangles to deduce related facts and find missing lengths and angles

Spring

Number and Place Value
- Count forward and backwards in steps of powers of 10 for any given number up to 1,000
- Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 or 100,000

Addition and Subtraction
- Use rounding to check answers and determine, in the context of the problem, levels of accuracy

Multiplication and Division
- Multiply and divide numbers mentally drawing upon known facts
- Multiply numbers up to 4-digits by a 1-digit or 2-digit number using a formal written method, including short multiplication for 2-digit numbers
- Divide numbers up to 4-digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context
- Solve problems involving addition, subtraction, multiplication and a combination of these, including understanding of the equals sign

Fractions and Decimals
- Add and subtract fractions with the same denominator, and denominators that are multiples of the same number
- Multiply proper fractions and mixed numbers by whole numbers
- Count up and down in thousandths and recognise that thousandths arise from dividing an object, number or quantity into 1000 equal parts
- Read and write decimal numbers as fractions eg, 0.71 = 71/100
- Round decimals with two decimal places to the nearest whole number and to one decimal place
- Read, write, order and compare numbers with up to three decimal places
- Solve problems involving number up to three decimal places

Geometry
- Distinguish between regular and irregular polygons based on reasoning about equal sides and angles
- Identify 3D shapes, including cubes and other cuboids, from their 2D representations

Summer

Number and Place Value
- Read Roman numerals to 1000 and recognise years written in Roman numerals

Addition and Subtraction
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Multiplication and Division
- Solve problems involving multiplication and division including scaling by simple fractions and problems involving simple rates

Fractions, Decimals and Percentages
- Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4 ,1/5, 2/5 ,4/5 and those fractions with a denominator of a multiple of 10 or 25
- Recognise the percent symbol (%) and understand that percent relates to 'number of parts per 100', and write percentages as a fraction with denominator 100, and as a decimal
- Mentally add and subtract tenths and one-digit whole numbers and tenths

Geometry
- Know angles are measured in degrees
- Estimate and compare acute, obtuse and reflex angles
- Identify angles at a point on a straight line and ½ a turn as 180°
- Identify angles at a point and one whole turn as 360°
- Identify multiples of 90°
- Draw given angles and measure them in degrees

Statistics
- Complete, read and interpret information in tables, including timetables
- Solve comparison, addition and difference problems using information presented in a line graph

Measurement
- Estimate volume (eg, using 1cm³ blocks to build cuboids) and capacity (eg, using water)
- Convert between different units of metric measure – km/m, cm/m, cm/mm, g/kg, l/ml
- Solve problems involving converting between units of time
- Use approximate equivalences between metric units and common imperial units such as inches, pounds and pints

In Year 5, our greater depth mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Understand and apply increasingly complex concepts and relationships Firmly established fluency in remembering facts and relationships
Logical reasoning (making an argument using facts and connections)	Demonstrate relationships between and within concepts Work systematically to prove all possible solutions to a problem Explain and justify mathematical solutions or strategies
Strategic competence (apply the right strategy to find solutions)	Use a range of strategies to efficiently solve problems Work backwards to solve a problem

Year 6 Overview

Number and place value	• Positive integers • Negative numbers • Numbers to 10million	**Addition & subtraction**	• Addition and subtraction of numbers of any size • Calculating with decimals	**Calculation** **Pupils consolidate these strategies and choose the most efficient methods for their calculation in Y6** • Partitioning (relates to all four operations) • Compensation • Redistribution • Making connections between numbers • Column addition and subtraction • Bar modelling • Long multiplication • Long division • Rounding, estimation and inverse to check calculations
Multiplication and Division	• All X tables • Calculations with four operations • Common factors and multiples and prime numbers • Multiply 4 digit by 2 digit number • Divide 4 digit by 2 digit including remainders as decimals	**Fractions and decimals**	• Adding and subtracting fractions with different denominators and mixed numbers • Multiply and divide fractions • Calculating with percentages • Rounding • Improper fractions • Problems with fractions, decimals and percentages	
Measurement	• Solving problems involving converting between units of measure • Area and volume and perimeter – formulae • Units of measure up to 3 decimal places • Area of parallelograms and triangles	**Geometry**	• Circles – radius, diameter and circumference • Building and drawing 2D and 3D shapes and nets • Classifying shapes • Missing angles and lengths • Coordinates – all 4 quadrants • Translation and reflection	
Statistics	• Pie charts and line graphs • The mean average • Mode and median			
Ratio and proportion	• Solving problems involving ratio and proportion • Relative sizes • Missing values • Scale factors	**Algebra**	• Simple formulae • Linear number sequences • Express missing numbers algebraically • Equations with 2 unknowns • Brackets (BIDMAS)	

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Our Year 6 mathematicians should….

Autumn

Number and Place Value
- Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit
- Round any whole number to the required degree of accuracy

Addition and Subtraction
- Perform mental calculations including with mixed operations and large numbers
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

Multiplication and Division
- Identify common factors, common multiples and prime numbers
- Perform mental calculations, including with mixed numbers and large numbers
- Calculate using short multiplication and division, using knowledge of factors to solve 4-digit by 2-digit questions

Fractions
- Compare and order fractions including mixed number and improper fractions
- Use common factors to simplify fractions, use common multiples to express fractions in the same denomination
- Recall and use equivalences between simple fractions, decimals and percentages, including different contexts
- Add and subtract fractions with different denominations and mixed numbers, using the concept of equivalent fractions
- Multiply simple pairs of proper fractions, writing the answer in the simplest form
- Divide proper fractions by whole numbers
- Associate a fraction with division to calculate decimal fraction equivalents, for simple fractions
- Multiply simple pairs of proper fractions, writing the answer in the simplest form

Geometry
- Describe positions on the full coordinate grid – all four quadrants
- Draw and translate simple shapes on the coordinate grid and reflect them in the axes

Spring

Number and Place Value
- Use negative numbers in context and calculate intervals across zero

Addition and Subtraction
- Use knowledge of the order of operations to carry out calculations involving the four operations

Multiplication and Division
- Multiply multi-digit numbers up to 4-digits by a 2-digit whole number using the formal written method for short multiplication
- Divide numbers up to 4-digits by a 2-digit whole numbers using the formal written method of long division and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

Fractions, Decimals and Percentages
- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places
- Divide proper fractions by whole numbers
- Associate a fraction with division to calculate decimal fraction equivalents, for simple fractions
- Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places

Algebra
- Express missing number problems algebraically and use simple formulae
- Find pairs of numbers that satisfy number sentences with two unknowns
- Generate and describe linear number sequences
- Enumerate possibilities of combinations of two variables

Measurement
- Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm^3 and m^3, and extending to other units such as mm^3 and km^3
- Convert between miles and km
- Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from smaller units of measure to a larger unit, and vice versa, using decimal notation to three decimal places
- Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate
- Recognise when it is possible to use formulae for area and volume of shapes

Ratio and Proportion
- 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 of whole numbers or measures such as 15% of 360 and the use of percentages for comparison

Geometry
- Recognise, describe and build simple 3D shapes, including making nets

Summer

Number and Place Value
- Solve number and practical problems that involve all other year group number and place value objectives

Addition and Subtraction
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Multiplication and Division
- Solve multiplication and division multi-step problems in contexts, deciding which operations and methods to use and why

Fractions and Decimals
- 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
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

Statistics
- Interpret and construct pie charts and line graphs and use them to solve problems
- Calculate and interpret the mean, mode and median averages

Ratio and Proportion
- Solve problems involving similar shapes where the scale factor is known or can be found
- Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples

Geometry
- Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons
- Draw 2D shapes given dimensions and angles
- Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

Measurement
- Recognise that shapes with the same areas can have different perimeters and vice versa
- Calculate the area of parallelograms and triangles

In Year 6, our <u>greater depth</u> mathematicians will be able to…	
Conceptual understanding (knowing more than isolated facts)	Find examples and non-examples Spot patterns and make connections Make generalisations and follow their own line of enquiry Transfer learning into new and different contexts
Fluency	Understand and apply increasingly complex concepts and relationships Firmly established fluency in remembering facts and relationships
Logical reasoning (making an argument using facts and connections)	Demonstrate relationships between and within concepts Work systematically to prove all possible solutions to a problem Explain and justify mathematical solutions or strategies
Strategic competence (apply the right strategy to find solutions)	Use a range of strategies to efficiently solve problems Work backwards to solve a problem

Vocabulary							
Number and Place Value	**EYFS/KS1** Subitising Greater than/less than Ordinal number Consecutive Backwards/forwards More/most Less/least Equal/equivalent Numeral vs Digit vs number vs integer Number bond Partition Ones / tens / hundreds Exchange Re-group Digit vs number **KS2** Integer Roman numerals Positive and negative Place holder Decimal Thousand/ten thousand/one million/ten million Rounding Approximation - the sign ≈ is used.	**Addition and Subtraction**	**EYFS / KS1** Commutative law Compensation Inverse operation Add Addend Sum Minus Subtrahend Minuend Difference Number sentence Bridging Exchange Re-group **KS2** Inverse Estimation Approximate Column addition or subtraction Decomposition	**Multiplication and Division**	**EYFS/KS1** Lots of / groups of / equal groups Double/doubling Twice as much as… / Half as much as… Grouping / sharing Half/quarter Halving Commutative law / commutativity Array Row / column Multiply / divide Multiple of Equation Bar model Repeated addition Repeated subtraction Factor / product Dividend / divisor / quotient **KS2** Common factor / highest common factor Common multiple / lowest common multiple Square and cubed numbers Divisible Long/short division and long /short multiplication Prime factor / prime number Composite numbers Power (of ten) / indices Remainder Distributive law Order of operations (BIDMAS) Brackets	**Fractions, Decimals, Percentages and Ratio**	**EYFS/KS1** Fraction Whole Equal part Parts of a whole Half Quarter Third Unit fraction Numerator Denominator Equivalent **KS2** Proper fraction Improper fraction Mixed number Equivalent fraction Simplest form Hundredths / tenths Decimal Decimal point / decimal place Percentage Enlargement Proportion Scale factor Simplify Highest common factor lowest common multiple

Geometry	**KS1** Left/right Forwards/backwards Above/below In between/on top Turn (quarter, half, three-quarter, full) Clockwise / anti-clockwise Face Surface / curved surface Edge Apex Oblong Orientation Pattern Position Symmetry Vertical line of symmetry Vertex **KS2** Horizontal / vertical Parallel Perpendicular Circumference Diameter Radius Area Angle (right, acute, obtuse, reflex) Scalene/isosceles / equilateral/ right angle triangle Rotation symmetry Coordinate Translate / Reflect Mirror line Vertically opposite	**Measurement**	**KS1** Length/height Taller/shorter/longer Non-standard unit Centimetre Unit of measurement – centi / mili- Heavier/lighter Full/empty/almost full/almost empty More/less Before/after Morning/afternoon/evening First/next/then/finally Days of the week and months of the year O'clock Seconds/minutes/hours Duration Penny/pence Price/cost Spend/spent stat Total Degrees Celsius Capacity vs volume Chronological Mass – **do not use the term weight** **KS2** Convert a.m./p.m. 24-hour Analogue/digital Leap year Perimeter Rectilinear shape Right angle Prefixes relating to measurement e.g. kilo-, centi- Imperial and metric units	**Statistics**	**KS1** Tally Axis Block diagram Pictogram Venn diagram **KS2** Bar Chart Pie charts Carroll diagram Scatter plots (x,y) Average – median, mode and mean Continuous data Histogram Interval Quadrant Scale	**Algebra**	**KS2** Equation Formula Substitution Expression

Maths: Progression of Knowledge & Skills