Chetwynde School - Whole School Maths Overview

Substantive Knowledge:	Number	Calculation	Fractions, Decimals, Percentages, Ratio & Algebra	Measurement	Geometry	Statistics
Disciplinary Knowledge:	Mathematical Thinking & Reasoning	Problem-Solving Strategies	Mathematical Representation	Mathematical Communication	Generalising, Conjecturing & Justifying	Disciplinary Literacy

	Learning		
	Mathematics in the Early Years provides children with the foundations for all future mathematical learning. Through practical exploration, play, stories, songs and meaningful experiences, children develop confidence with numbers, patterns, shape, space and measure. Children learn to notice relationships, communicate mathematical ideas, solve problems and reason about the world around them.		
	Number	Numerical Patterns	Shape, Space & Measure
EYFS	• Have a deep understanding of numbers to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5. • Recall number bonds to 5 and some number bonds to 10. • Automatically recall number facts, including doubling facts and number bonds where appropriate. • Compare quantities and understand the relationships between numbers.	• Verbally count beyond 20, recognising the pattern of the counting system. • Compare quantities and identify when amounts are greater than, less than or equal. • Explore, recognise, continue and create repeating patterns. • Understand how quantities can be distributed and grouped in different ways. • Develop an understanding of odd and even patterns through practical exploration.	• Explore, compare and describe the properties of 2D and 3D shapes. • Select, rotate and manipulate shapes to develop spatial reasoning. • Compare length, height, mass, capacity and time using everyday language. • Use positional language to describe location, movement and direction. • Recognise, create and talk about patterns in the environment.

	Learning		
	In Year 1, children build upon their Early Years mathematical experiences and begin to develop a secure understanding of number, place value and calculation. Through practical resources, pictorial representations and problem-solving activities, pupils develop fluency with number facts, apply mathematical reasoning and communicate their understanding using mathematical language. Children learn to recognise connections between different areas of mathematics and begin to apply their knowledge in real-life contexts.		
	Number	Addition & Subtraction	Shape, Measure & Time
Year 1	• To know how to count forwards and backwards within 20 and beyond. • To know how to read and write numerals confidently. • To know how numbers can be represented using objects, pictures and numerals. • To know the value of numbers within 20 and beyond. • To know how to compare numbers using greater than, less than and equal to. • To know how to order numbers from smallest to greatest. • To know how number lines can be used to represent and compare numbers. • To know how counting in multiples of 2, 5 and 10 helps identify patterns.	• To know and recall number bonds within 10. • To know and recall number bonds within 20. • To know how addition combines quantities. • To know how subtraction finds the difference between quantities. • To know how part-whole models represent number relationships. • To know how fact families, show connections between calculations. • To know that addition and subtraction are inverse operations. • To know how to solve one-step addition and subtraction problems. • To know how mathematical equipment and representations support calculation. • To know how reasoning can be used to explain solutions.	• To know the names and properties of common 2D shapes. • To know the names and properties of common 3D shapes. • To know how to sort shapes according to their properties. • To know how to compare and measure length and height. • To know how to compare and measure mass and volume. • To know how money is represented using coins and notes. • To know how to recognise and combine different coin values. • To know the days of the week and months of the year. • To know how to tell the time to o'clock and half past. • To know how language can describe position, direction and movement. • To know how mathematics helps us solve everyday problems.

	Learning				
	In Year 2, children build confidence and fluency with number, calculation and mathematical reasoning. Pupils develop their understanding of place value to 100, strengthen their recall of key number facts and begin to apply multiplication, division and fractions in meaningful contexts. Through practical resources, pictorial representations and problem-solving activities, children make connections between mathematical concepts and apply their learning to everyday situations.				
	Number	Calculation	Measurement	Geometry	Statistics
Year 2	• To know the value of each digit in a 2-digit number. • To know how to partition numbers into tens and ones. • To know how to compare and order numbers to 100. • To know how to count forwards and backwards in steps of 2, 3, 5 and 10. • To know how to estimate quantities and compare numbers. • To know how place value supports efficient calculation.	• To know and recall addition and subtraction facts to 20. • To know how related facts can be used to solve calculations efficiently. • To know how to add and subtract two 2-digit numbers. • To know how to solve one-step and two-step addition and subtraction problems. • To know that multiplication involves equal groups. • To know that division involves sharing and grouping. • To know and recall multiplication and division facts for the 2, 5- and 10-times tables. • To know how multiplication and division are linked.	• To know how to measure and compare length and height. • To know how to measure and compare mass. • To know how to measure and compare capacity and volume. • To know how temperature is measured and compared. • To know how to recognise and use coins and notes. • To know how to calculate totals and find change. • To know how to tell and write the time to five-minute intervals. • To know how to compare different units of measure.	• To know the properties of common 2D shapes. • To know the properties of common 3D shapes. • To know how to sort shapes according to their properties. • To know how to identify lines of symmetry. • To know how to describe position and movement. • To know how shape knowledge can be applied in everyday life.	• To know how data can be collected and organised. • To know how tally charts can record information. • To know how pictograms, represent data. • To know how block graphs, represent data. • To know how to interpret information from charts and graphs. • To know how data can be used to answer mathematical questions.

	Learning				
	In Year 3, pupils transition from Key Stage 1 mathematics to more formal mathematical methods and reasoning. Children develop a secure understanding of place value to 1,000, strengthen multiplication and division fluency, and make connections between fractions, calculation and problem solving. Through practical resources, visual representations and increasingly abstract methods, pupils deepen their conceptual understanding and apply mathematics to a wide range of contexts.				
	Number	Calculation	Measurement	Geometry	Statistics
Year 3	• To know the value of each digit in a 3-digit number. • To know how to represent numbers using place value equipment, number lines and pictorial models. • To know how to partition numbers into hundreds, tens and ones. • To know how to compare and order numbers to 1,000. • To know how to count from 0 in multiples of 4, 8, 50 and 100. • To know how to find 10 or 100 more or less than a given number. • To know how to round numbers to the nearest 10 and 100. • To know how estimation can be used to check the reasonableness of answers.	• To know how to use formal written methods for addition and subtraction. • To know how to add and subtract numbers mentally using known facts. • To know and recall multiplication and division facts for the 3, 4- and 8-times tables. • To know how multiplication and division are related. • To know how arrays, grouping and sharing represent multiplication and division. • To know how to multiply a 2-digit number by a 1-digit number. • To know how to solve correspondence and scaling problems. • To know how inverse operations can be used to check answers. • To know how efficient methods can be selected for different calculations.	• To know how to measure, compare, add and subtract lengths. • To know how to measure and compare mass accurately. • To know how to measure and compare capacity and volume. • To know how perimeter measures the distance around a shape. • To know how to measure and calculate perimeter. • To know how to compare and calculate amounts of money. • To know how to tell the time using analogue and digital clocks. • To know how to convert between hours and minutes. • To know how measurement can support real-life decision making.	• To know the properties of common 2D shapes. • To know the properties of common 3D shapes. • To know how shapes can be classified according to their properties. • To know that angles describe turns and corners. • To know how to identify right angles. • To know how horizontal, vertical, parallel and perpendicular lines are represented. • To know how shape properties help us compare and sort shapes. • To know how positional and directional language can describe movement.	• To know how data can be collected systematically. • To know how information can be organised into tables. • To know how bar charts, represent data. • To know how pictograms can be used to present information. • To know how to interpret and compare data presented in different formats. • To know how data can be used to answer questions and solve problems. • To know how conclusions can be drawn from information presented in charts and graphs.

	Learning				
	In Year 4, pupils develop greater fluency, efficiency and accuracy across all areas of mathematics. Children build secure knowledge of place value to 10,000, develop automatic recall of all multiplication facts to 12 × 12 and apply their understanding to increasingly complex reasoning and problem-solving contexts. Through the use of concrete resources, pictorial representations and abstract methods, pupils deepen their conceptual understanding and make connections between different areas of mathematics.				
	Number	Calculation	Measurement	Geometry	Statistics
Year 4	• To know the value of each digit in numbers up to 10,000. • To know how to partition numbers in different ways. • To know how to compare and order numbers beyond 1,000. • To know how to count in multiples of 6, 7, 9, 25 and 1,000. • To know how to find 1,000 more or less than a given number. • To know how to round numbers to the nearest 10, 100 and 1,000. • To know how to estimate and check the reasonableness of answers. • To know how Roman numerals represent numbers to 100. • To know how place value supports efficient mental and written calculation.	• To know and recall all multiplication and division facts up to 12 × 12. • To know how multiplication and division facts are connected. • To know the meaning of factor, multiple and product. • To know how to multiply 2-digit and 3-digit numbers by a 1-digit number. • To know how to divide numbers using formal written methods. • To know how to use efficient mental strategies for calculation. • To know how inverse operations can be used to check answers. • To know how to select appropriate methods for solving calculations. • To know how multi-step problems can be solved using more than one operation. • To know how mathematical reasoning can be used to justify solutions.	• To know how to measure and calculate perimeter. • To know how area measures the surface within a shape. • To know how to calculate area by counting squares. • To know how to convert between different units of measure. • To know how to use decimals in measurement contexts. • To know how to estimate and compare measurements. • To know how to solve problems involving money. • To know how to convert between analogue and digital time. • To know how to solve problems involving hours, minutes and seconds. • To know how measurement supports real-world decision-making.	• To know how to identify and classify triangles according to their properties. • To know how to identify and classify quadrilaterals. • To know the properties of regular and irregular polygons. • To know what an angle represents. • To know how to identify right angles. • To know how to compare and order angles by size. • To know how symmetry can be identified in shapes. • To know how coordinates can describe position on a grid. • To know how shape properties can be used to classify and compare shapes.	• To know how data can be collected systematically. • To know how tables can be used to organise information. • To know how bar charts, represent data. • To know how line graphs can represent change over time. • To know how information can be extracted from charts and graphs. • To know how comparisons can be made using data. • To know how conclusions can be drawn from statistical information. • To know how data can be used to support decision-making and investigations.

	Learning					
	In Year 6, pupils consolidate and extend their mathematical understanding in preparation for Key Stage 3. Children develop fluency with increasingly complex calculations, deepen their understanding of fractions, decimals, percentages, ratio and algebra, and apply their knowledge to sophisticated reasoning and problem-solving contexts. Pupils are expected to communicate mathematical ideas precisely, justify their thinking and recognise connections across different areas of mathematics.					
	Number	Calculation	Fractions, Decimals & Percentages	Measurement	Geometry	Statistics
Year 5	• To know the value of each digit in numbers up to 1,000,000. • To know how to read, write, compare and order numbers to 1,000,000. • To know how to count forwards and backwards through zero. • To know how to interpret negative numbers in real-life contexts. • To know how to round numbers to the nearest 10, 100, 1,000, 10,000 and 100,000. • To know how to estimate and check the reasonableness of answers. • To know what factors, multiples and common multiples are. • To know what prime numbers are and identify primes to 100. • To know how square numbers and cube numbers are generated. • To know how place value can be used to solve increasingly complex mathematical problems.	• To know how to use formal written methods for addition and subtraction involving increasingly large numbers. • To know how to multiply numbers up to 4 digits by a 1-digit or 2-digit number. • To know how to divide numbers up to 4 digits by a 1-digit number. • To know how factors and multiples can support efficient calculation. • To know how mental calculation strategies can be applied flexibly. • To know how to identify and use inverse operations. • To know how to solve multi-step problems involving more than one operation. • To know how to choose efficient methods depending on the problem. • To know how estimation can be used to check the accuracy of solutions. • To know how mathematical reasoning supports the selection of suitable strategies.	• To know how to identify and generate equivalent fractions. • To know how to compare and order fractions whose denominators are multiples of the same number. • To know how to convert improper fractions into mixed numbers and vice versa. • To know how to add and subtract fractions with related denominators. • To know how to multiply fractions by whole numbers. • To know how fractions can be represented as decimals. • To know how fractions, decimals and percentages are equivalent representations of the same value. • To know how percentages can be interpreted as "parts per hundred". • To know how to solve problems involving fractions, decimals and percentages. • To know how proportional relationships underpin many areas of mathematics.	• To know how to calculate perimeter of composite rectilinear shapes. • To know how to calculate and compare area. • To know how to estimate and measure volume and capacity. • To know how to solve problems involving metric units of measure. • To know how to convert between different units of length, mass and capacity. • To know how to use decimal notation when measuring. • To know how to solve problems involving time. • To know how measurement is applied in real-life contexts including science, design and commerce.	• To know the properties of rectangles, regular polygons and 3D shapes. • To know how angles are measured and compared. • To know how to identify acute, obtuse and reflex angles. • To know how to estimate and measure angles using a protractor. • To know how reflection changes the position of a shape. • To know how translation changes the position of a shape. • To know how coordinates describe position on a grid. • To know how shape properties can be used to solve geometrical problems. • To know how geometrical reasoning can be used to justify conclusions.	• To know how data can be collected systematically. • To know how line graphs represent change over time. • To know how tables can be used to organise information. • To know how timetables can be interpreted and analysed. • To know how data can be compared and interpreted. • To know how conclusions can be drawn from statistical evidence. • To know how statistics can be used to answer questions and solve problems. • To know how data supports decision-making in everyday life.

	Learning					
	In Year 5, pupils develop a deeper understanding of number, calculation and proportional reasoning. They work with increasingly large numbers, strengthen their understanding of fractions, decimals and percentages, and apply mathematical knowledge to more complex problem-solving situations. Pupils are expected to explain, justify and evaluate their methods, making connections across different areas of mathematics and recognising underlying mathematical structures.					
	Number	Calculation	Fractions, Decimals, Percentages, Ratio & Algebra	Measurement	Geometry	Statistics
Year 6	• To know the value of each digit in numbers up to 10 million. • To know how to read, write, compare and order numbers to 10 million. • To know how to round numbers to a required degree of accuracy. • To know how negative numbers are used in real-life contexts. • To know how to calculate intervals across zero. • To know how factors, multiples and prime numbers support efficient calculation. • To know how common factors and common multiples can be identified. • To know how place value can be used to solve increasingly complex problems. • To know how estimation can be used to check the reasonableness of answers. • To know how numerical patterns can be recognised and generalised.	• To know how to use formal written methods for all four operations confidently and accurately. • To know how to choose efficient mental and written calculation strategies. • To know how to solve multi-step problems involving different operations. • To know how inverse operations can be used to check calculations. • To know how to apply order of operations when solving calculations. • To know how common factors can simplify calculations. • To know how estimation can be used before and after calculating. • To know how calculations can be applied in a range of mathematical and real-life contexts. • To know how efficient methods can improve the accuracy of problem solving.	• To know how to compare, order and simplify fractions. • To know how to perform calculations involving fractions. • To know how fractions, decimals and percentages represent equivalent values. • To know how to convert between fractions, decimals and percentages. • To know how percentages can be used to solve problems involving increase and decrease. • To know how ratio compares quantities and relationships. • To know how proportion can be used to solve practical problems. • To know how algebra uses symbols to represent unknown values. • To know how formulae can express mathematical relationships. • To know how simple equations can be formed and solved. • To know how mathematical patterns can be represented and generalised algebraically.	• To know how to calculate perimeter, area and volume. • To know how to calculate the area of triangles and parallelograms. • To know how volume is measured using cubic units. • To know how to solve problems involving scale. • To know how to convert between metric units of measure. • To know how to use and interpret decimal measures. • To know how measurement can be applied to practical investigations and real-life situations. • To know how estimation can support accurate measurement.	• To know the properties of 2D and 3D shapes. • To know how shapes can be classified according to their properties. • To know how angles can be measured, compared and calculated. • To know how unknown angles can be determined using known facts. • To know the relationship between radius, diameter and circumference. • To know how coordinates can describe position and movement. • To know how shapes can be translated and reflected on a coordinate grid. • To know how geometrical reasoning can be used to solve problems and justify conclusions. • To know how spatial reasoning supports mathematical understanding.	• To know how data can be collected and organised systematically. • To know how line graphs can be interpreted and compared. • To know how pie charts represent proportions of a whole. • To know how statistical information can be presented in a variety of forms. • To know how the mean average can be calculated and interpreted. • To know how conclusions can be drawn from data. • To know how statistical evidence can be used to support reasoning. • To know how data can be used to solve problems and inform decision-making.