Westfields JUNIOR SCHOOL

Maths Curriculum
Progression of Skills and Knowledge

At Westfields Junior School, we provide an engaging, creative and purposeful mathematics curriculum which aims to ensure that all learners become fluent mathematicians with the capacity to reason and problem solve. Lessons are planned carefully and delivered in small steps. Through a variety of different methods, using a range of resources and equipment, we ensure that our curriculum provides appropriate levels of support and challenge for all learners to achieve and exceed age related expectations. Through our curriculum, we want learners to understand that Maths has provided the solution to some of history's most intriguing problems and is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment.

The National Curriculum for Maths
Years 3 - 6

The national curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

	Maths Curriculum Progression				
	Year 3	**Year 4**	**Year 5**		**Year 6**
Place Value	• Count from 0 in multiples of 4 and 8. • Count from 0 in multiples of 50 and 100. • Find 10 or 100 more or less than a given number. • Recognise the place value of each digit in a 3-digit number. • Compare and order numbers up to 1,000. • Identify, represent and estimate numbers. • Read and write numbers up to 1,000 in numerals and in words.	• Count from 0 in multiples of 6, 7 and 9. • Count from 0 in multiples of 25 and 1000. • Find 10 or 100 more or less than a given number. • Find 1,000 more or less than a given number. • Count backwards through 0 into negative numbers. • Recognise the place value of each digit in a four-digit number. • Order and compare numbers beyond 1,000.	• Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit. • Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000. • Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0. • Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000.		• Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit. • Round any whole number to a required degree of accuracy. • Use negative numbers in context and calculate intervals across 0.

	• Investigate and solve problems involving the place value of numbers.	• Identify, represent and estimate numbers. • Round any number to the nearest 10, 100 or 1,000. • Solve number and practical problems. • Read Roman numerals to 100.	• Read Roman numerals to 1,000 and recognise years written in Roman numerals. • Solve number problems and practical problems that involve place value.		
Addition and Subtraction	• Add and subtract a 1s, 10s and 100s number from a three-digit number mentally. • Add and subtract numbers with up to 3 digits, using formal written methods. • Estimate the answer to a calculation. • Use inverse operations to check answers. • Solve problems using addition and subtraction.	• Add and subtract numbers with up to 4 digits using the formal written methods. • Estimate and use inverse operations to check answers to a calculation. • Solve addition and subtraction two-step reasoning problems, deciding which operations and methods to use and why.	• Add whole numbers with more than 4 digits, including using formal written methods. • Subtract whole numbers with more than 4 digits, including using formal written methods. • Use rounding to check answers to calculations. • Mentally add and subtract increasingly larger numbers. • Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	**Number Operations**	• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using long multiplication. • Divide numbers up to 4 digits by a two-digit whole number using long division, and interpret remainders as whole numbers, fractions or by rounding appropriately for the context. • Divide numbers up to 4 digits by a two-digit number using short division, interpreting remainders appropriately for the context. • Perform mental calculations with mixed operations and large numbers. • Identify common factors, common multiples and prime numbers. • Solve problems involving addition, subtraction, multiplication and division. • Use estimation to check answers to calculations and determine an appropriate degree of accuracy in the context of a problem.
Multiplication and Division	• Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. • Use my multiplication tables to help solve other multiplication and division problems (e.g. If I know 2 x 3 = 6, I know 20 x 3 = 60). • Write and solve multiplication and division problems using formal written methods. • Solve problems using multiplication and division.	• Recall multiplication and division facts for multiplication tables up to 12 × 12. • Use my multiplication tables to help solve other multiplication and division problems (e.g. If I know 7 x 8 = 56, I know 560 ÷ 8 = 70). • Use my multiplication facts to multiply 3 numbers together. • Recognise and use factor pairs and 'commutativity' (If 6 x 5 = 30, 5 x 6 = 30) in mental calculations. • Multiply two-digit and three-digit numbers by a one-digit number using formal written methods. • Solve problems involving multiplication and division.	• Identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers. • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. • Establish whether a number up to 100 is prime and recall prime numbers up to 19. • Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers. • Multiply and divide numbers mentally, drawing upon known facts. • Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.		

			• Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000. • Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}). • Solve problems involving multiplication and division.		
				Ratio	• Use multiplication and division facts to solve problems involving the relative sizes of 2 quantities. • Solve problems involving the calculation of percentages and use percentages for comparison. • Use the knowledge of fractions and multiples to solve problems involving scale factors.
				Algebra	• Use simple formulae. • Generate and describe linear number sequences. • Express missing number problems algebraically. • Find pairs of numbers that satisfy an equation with 2 unknowns.
				Percentages	• Recall and use equivalences between simple fractions, decimals and percentages in different contexts.

Fractions	• Count up and down in tenths. • Recognise, find and write fractions of a set of objects. • Compare and order fractions. • Recognise and show, using diagrams, equivalent fractions. • Add and subtract fractions with the same denominator. • Solve problems involving fractions.	• Recognise and show, using diagrams, families of common equivalent fractions. • Count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10. • Solve use fractions to calculate quantities. • Add and subtract fractions with the same denominator. • Solve measurement and money problems involving fractions. • Recognise and write decimal equivalents of any number of tenths or hundreds (e.g. 1/10 = 0.1). • Recognise and write decimal equivalents to 1/4, 1/2, and a 3/4. • Divide a one or two-digit number by 10 and 100. • Round decimals with 1 decimal place to the nearest whole number. • Compare and order decimals numbers (up to hundredths). • Solve simple measure and money problems involving decimals numbers.	• Compare and order fractions whose denominators are all multiples of the same number. • 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. • 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, using concrete and pictoral resources. • Read and write decimal numbers as fractions. • Solve problems which require knowing those fractions with a denominator of a multiple of 10 or 25. • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • Round decimals with 2 decimal places to the nearest whole number and to 1 decimal place. • Read, write, order and compare numbers with up to 3 decimal places. • Solve problems involving numbers up to 3 decimal places. • Recognise the per cent symbol (%) and understand that per cent relates to ‘number of parts per 100’, and write percentages as a fraction with a denominator of 100, and as a decimal fraction. • Solve problems which require knowing percentage and decimal equivalents.	**Fractions and Decimals**	• Use common factors to simplify fractions and use common multiples to express fractions over a common denominator. • Compare and order fractions, including fractions greater than 1. • Add and subtract fractions and mixed numbers with different denominators, using the concept of equivalent fractions. • Multiply simple pairs of proper fractions, writing the answer in its simplest form. • Divide proper fractions by whole numbers. • Solve problems which require answers to be rounded. • Use division to calculate decimal fraction equivalents. • Identify the value of each digit in numbers given to 3 decimal places. • Multiply and divide numbers by 10, 100 and 1,000 giving answers up to 3 decimal places. • Multiply numbers with up to 2 decimal places by whole numbers. • Use written division methods in cases where the answer has up to 2 decimal places.

Measurement	• Add and subtract amounts of money to give change, using both pounds and pence. • Tell and write the time from an analogue clock, using 12-hour and 24-hour clocks. • Tell and write the time from an analogue clock, using Roman numerals from I to XII. • Use vocabulary such as o'clock, am, pm, morning, afternoon, noon and midnight. • Use the number of seconds in a minute and the number of days in each month, year and leap year. • Estimate and read time with increasing accuracy to the nearest minute. • Compare time in terms of seconds, minutes and hours. • Compare durations (length of time) of events and calculate how long an event takes. • Measure, compare, add and subtract mass in grams and kilograms. • Measure, compare, add and subtract volume/capacity in litres and millilitres. • Measure, compare, add and subtract lengths using millimetres, centimetres, metres and kilometres. • Measure the perimeter of simple 2-D shapes.	• Estimate, compare and calculate different measures, including money in pounds and pence. • Read, write and convert time between analogue and digital 12- and 24-hour clocks. • Solve problems involving converting from hours to minutes, minutes to seconds, years to months, weeks to days. • Convert between different units of measure (for example, kilometre to metre). • Measure and calculate the perimeter of rectangles and squares in centimetres and metres. • Find the area of rectangles and squares by counting squares.	• Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. • Calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm^2) and square metres (m^2), and estimate the area of irregular shapes. • Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. • Convert between different units of metric measure. • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. • Estimate volume and capacity.		• Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places. • Use, read, write and convert between measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, giving answers up to 3 decimal places. • Convert between miles and kilometres. • Recognise that shapes with the same areas can have different perimeters and vice versa. • Use formulae for area and volume of shapes. • Calculate the area of parallelograms and triangles. • Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres and cubic metres and extend this to other units of measure.
Geometry	• Draw 2-D shapes. • Make 3-D shapes using modelling materials. • Recognise 3-D shapes in different orientations and describe them. • Recognise angles as a property of shape. • Identify right angles.	• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. • Identify acute and obtuse angles and compare and order angles. • Identify lines of symmetry in 2D shapes presented in different orientations.	• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. • Draw given angles, and measure them in degrees (°).		• Draw 2-D shapes using given dimensions and angles. • Recognise, describe and build simple 3-D shapes, including making nets. • Compare and classify geometric shapes based on their properties and sizes and find unknown angles

	• Recognise that 2 right angles make a half-turn, 3 make three-quarters of a turn and 4 a complete turn. • Identify whether angles are greater than or less than a right angle (acute and obtuse angles). • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	• Complete a simple symmetric figure. • Describe and plot positions on a quadrant. • Explain the translations (movement) of a shape using the language of left/right and up/down. • Plot points and draw sides to complete a given polygon (many sided shape).	• Identify angles at a point and 1 whole turn. • Identify angles at a point on a straight line and half a turn. • Identify other multiples of 90°. • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • 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.		in any triangles, quadrilaterals, and regular polygons. • Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius. • Recognise and find missing angles which meet at a point, are on a straight line, or are vertically opposite. • Describe positions on the full coordinate grid. • Draw and translate simple shapes on the coordinate plane, and reflect them in the axis.
Statistics	• Collect, record, interpret and present data using bar charts, pictograms and tables. • Solve one-step and two-step questions using information presented in bar charts, pictograms and tables.	• Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. • Solve problems using information presented in bar charts, pictograms, tables and other graphs.	• Solve comparison, sum and difference problems using information presented in a line graph. • Complete, read and interpret information in tables, including timetables.		• Interpret and construct pie charts and line graphs and use these to solve problems. • Calculate and interpret the mean as an average.