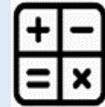# Shelton Junior School
Maths - Long-Term Progression of Knowledge and Skills

	DISCOVER – resilience and collaboration	INVESTIGATE – reflection and concentration	EXPLORE - curiosity
LKS2	- Y3 & 4: Place value - Y3 & 4: Addition and subtraction - Y3 & 4: Multiplication and Division - Y4: Measurement - Area	- Y3 & 4: Multiplication & division - Y3 & 4: Length and perimeter - Y3 & 4: Fractions - Y3: Mass and capacity - Y4: Decimals	- Y3: Fractions - Y4: Decimals - Y3 & 4: Money - Y3 & 4: Time - Y3 & 4: Shape - Y3 & 4: Statistics - Y4: Position and direction
UKS2	- Y5: Place value - Y5: Addition and Subtraction - Y5:Multiplication and division - Y5: Fractions A - Y6: Place value - Y6: Four operations - Y6: Fractions A - Y6: Fractions B - Y6: Converting units	- Y5: Multiplication and division - Y5: Fractions B - Y5: Decimals & percentages - Y5: Perimeter and area - Y5: Statistics - Y6: Ratio - Y6: Algebra - Y6: Decimals - Y6: Fractions, decimals and percentages - Y6: Area and volume - Y6: Statistics	- Y5: Shape - Y5: Position and direction - Y5: Decimals - Y5: Negative numbers - Y5: Converting units - Y5: Measurement - Y6: SATS consolidation - Y6: Shape - Y6: Position and direction - Y6: Themed projects, consolidation and problem solving

	Year 3 Skills	**Year 4 Skills**
Place value	• Consolidate and build on Year 2 skills. • Identify, represent and estimate numbers using different representations. • Find 10 or 100 more or less than a given number. • Recognise the place value of each digit in a three-digit number (hundreds, tens, ones). • Compare and order numbers up to 1000. • Read and write numbers up to 1000 in numerals and words • Solve problems and practical problems involving place value skills.	• Consolidate and build on Year 3 skills. • Identify, represent and estimate numbers using different representations. • Find 1000 more or less than a given number. • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, ones). • Compare and order numbers beyond 1000. • Round any number to the nearest 10, 100 or 1000. • Count backwards through zero to include negative numbers. • Read Roman numerals to 100 (I to C) and know that overtime, the numeral system changed to include the concept of zero and place value. • Solve number and practical problems involving place value skills, with increasingly large positive numbers.
Addition and subtraction	• Add and subtract numbers mentally, including: a three-digit number and ones; a three-digit number and tens; a three-digit number and hundreds. • Add and subtract numbers with up to three-digits, using formal written methods of columnar addition and subtraction. • Estimate the answer to a calculation and use inverse operations to check answers. • Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	• Add and subtract numbers with up to four-digits, using formal written methods of columnar addition and subtraction. • Estimate the answer to a calculation and use inverse operations to check answers. • Solve addition and subtraction two-step problems in context, deciding which operations and methods to use and why.

Multiplication and division	- Count from 0 in multiples of 4 and 8. - Count from 0 in multiples of 50 and 100. - Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables. - Write and calculate mathematical statements for multiplication and division using the multiplication tables they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. - Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.	- Count in multiples of 6, 7 and 9. - Count in multiples of 25 and 1000. - Recall and use multiplication and division facts for multiplication tables up to 12x12. - Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers - Recognise and use factor pairs and commutativity in mental calculations. - Multiply and divide two-digit and three-digit numbers by a one-digit number using formal written layout. - Solve problems, involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one-digit (Integer scaling problems such as n objects are connected to m objects).
Fractions	- Count up and down in tenths: recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10. - Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. - Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators. - Solve problems that involve tenths, unit fractions and non-unit fractions. - Recognise and show, using diagrams, equivalent fractions with small denominators. - Compare and order unit fractions, and fractions with the same denominators. - *Add and subtract fractions with the same denominator within one whole. - Solve problems that involve equivalent fractions, and ordering fractions.	- Count up and down in hundredths; recognise that hundredths arise when dividing an object by 100 and dividing tenths by 10. - Recognise and show, using diagrams, families of common equivalent fractions. - Add and subtract fractions with the same denominator. - Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number.

Decimals		• Recognise and write decimal equivalents of any number of tenths or hundredths. • Find the effect of dividing a one or two-digit number by 10 or 100 identifying the value of the digits in the answer as ones, tenths and hundredths. • Compare numbers with the same number of decimal places up to two decimal places. • Round decimals with one decimal place to the nearest whole number. • Recognise and write decimal equivalents to 1/4, 1/2 and 3/4. • Solve simple measure and money problems involving fractions and decimals to two places
Time	• Tell and write the time from an analogue clock, including using Roman Numerals from I to XII and 12-hour and 24-hour clocks. • Estimate and read time with increasing accuracy to the nearest minute. • Record and compare time in terms of seconds, minutes and hours. • Use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight. • Know the number of seconds in a minute and the number of days in each month, year and leap year.	• Read, write and convert time between analogue and digital 12-hour and 24-hour clocks. • Convert between units of measure - Time: hours to minutes; minutes to seconds; years to months; weeks to days. • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.
Money	• Add and subtract amounts of money to give change, using both £ and p in practical contexts.	
Length	• Measure, compare, add and subtract: lengths (m/cm/mm)	
Mass	• Measure, compare, add and subtract: mass (kg/g)	
Capacity	• Measure, compare, add and subtract: volume/capacity (l/ml)	
Measurement		• Estimate, compare and calculate different measures, including amounts of money in pounds and pence. • Convert between units of measure - mm/cm, cm/m, m/km, g/kg, ml/l
Perimeter	• Measure the perimeter of simple 2-D shapes.	• Measure and calculate the perimeter of a rectilinear figure (including squares) in cm and m.
Area		• Find the area of rectilinear shapes by counting squares.

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Properties of a shape	- Recognise angles as a property of shape or a description of a turn. - Identify right angles; recognise that 2 right angles make a half-turn, 3 make three quarters of a turn and 4 make 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. - Draw 2-D shapes and make 3-D shapes using modelling materials. - Recognise 3-D shapes in different orientations and describe them.	- Identify acute and obtuse angles; compare and order angles up to 2 right angles by size. - Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. - Identify lines of symmetry in 2-D shapes presented in different orientations. - Complete a simple symmetric figure with respect to a specific line of symmetry.
Position and Direction		- Plot specified points and draw sides to complete a given polygon. - Describe movements between positions as translations of a given unit to the left/right and up/down.
Statistics	- Interpret and present data using bar charts, pictograms and tables. - Solve one-step and two-step questions using information presented in scaled bar charts, pictograms and tables.	- 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 and other graphs.

	Year 5 Skills	Year 6 Skills
Place value	• 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 to 1,000,000. • Interpret negative numbers in context; count forwards and backwards with positive and negative whole numbers including through zero. • Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000. • Solve number and practical problems involving place value skills. • Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	• Read, write, order and compare numbers to at least 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 zero. • Solve number and practical problems involving place value skills.
Addition and subtraction	• Add and subtract numbers with more than four-digits, including using formal written methods of columnar addition and subtraction. • Add and subtract numbers mentally with increasingly large numbers. • Use rounding to check answers to calculations. • Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.	• Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
Multiplication and division	• Multiply and divide numbers mentally drawing upon known facts. • Multiply and divide whole numbers by 10, 100 and 1,000 • Identify multiples and factors, including finding all pairs of a number, and common factors of two numbers. • Recognise and use square numbers and cube numbers and the associated notation. • Solve problems involving multiplication and division (including knowledge of factors, multiples, squares and cubes). • Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. • Multiply numbers up to four-digits by a one or two-digit number using a formal written method, including long multiplication for two-digit numbers. • Divide numbers up to four-digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context. • Establish whether a number up to 100 is prime and recall prime numbers up to 19.	• Multiply a multi-digit number (up to four-digits) by a two-digit number using the formal written method of long multiplication. • Divide numbers up to four-digits by a two-digit whole number using the formal written method of long division; interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context. • Divide numbers up to four-digits by a two-digit whole number using the formal written method of short division, interpreting remainders according to the context. • Identify common factors, common multiples and prime numbers.

4 operations	• Solve problems involving addition and subtraction, multiplication and division and any combination of these, including understanding the use of the equals sign.	• Use their knowledge of the order of operations to carry out calculations involving the four operations – BODMAS. • Perform mental calculations, including with mixed operations and large numbers. • Solve problems involving addition and subtraction, multiplication and division. • Use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy.
Fractions	• Compare and order factions whose denominators are multiples of the same number. • Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. • Add and subtract fractions with the same denominator and denominators that are multiples of the same number. • Recognise mixed numbers and improper fractions and convert from one form to the other; write mathematical statements >1 as a mixed number. • Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. • Read and write decimal numbers as fractions. • Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	• Compare and order factions including fractions > 1. • Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. • 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 its simplest form. • Divide proper fractions by whole numbers. • Associate a fraction with division and calculate decimal fraction equivalents for a simple fraction.
Decimals	• Read, write, order and compare numbers with up to three decimal places. • Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. • Round decimals with two decimal places to the nearest whole number and to one decimal place. • Multiply and divide whole numbers and decimals by 10, 100 and 1,000. • Solve problems involving numbers with up to three decimal places. • Use all four operations to solve problems involving units of measure using decimal notation. • Recognise the % symbol and understand that per cent relates to 'number of parts per hundred'; write percentages as a fraction with denominator 100, and as a decimal. • 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.	• Identify the value of each digit in numbers given to 3 decimal places; multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places. • Multiply one-digit 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. • Solve problems which require answers to be rounded to specified degrees of accuracy.
Percentages		• Solve problems involving the calculation of percentages and the use of percentage comparisons. • Recall and use equivalences between simple fractions, decimals and percentages including in different contexts.

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Algebra		• Use simple formulae: express missing number problems algebraically. • Generate and describe linear number sequences. • Find pairs of numbers that satisfy an equation with two unknowns.
Ratio		• 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 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.
Area (Y5) **Area and volume (Y6)**	• Calculate and compare the area of rectangles (including squares); including using standard units' cm2, m 2, estimate the area of irregular shapes.	• Recognise that shapes with the same areas can have different perimeters and vice versa. • Recognise when it is possible to use formulae for area and volume of shapes. • Calculate the area of parallelograms and triangles. • Calculate, estimate and compare the volume of cubes and cuboids using standard units, including cm3, m3 and extending to other units (mm3, km3).
Perimeter	• Measure and calculate the perimeter of composite rectilinear shapes in cm and m.	
Measurement	• Convert between units of measure and solve problems - mm/cm, cm/m, m/km, g/kg, ml/l and units of time. • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. • Estimate volume (e.g. 1cm3 blocks to build cuboids): Estimate capacity (e.g. using water).	
Converting units		• Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, (and vice versa) using decimal notation up to 3 decimal places. Solve problems involving these skills. • Convert between miles and kilometres.
Position and direction	• Identify, describe and represent, the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	• Describe positions on the full coordinate grid (all four quadrants). • Draw and translate shapes on the coordinate plane and reflect them in the axes.

Properties of shape	• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • Use the properties of rectangles to deduce related facts and find missing lengths and angles. • Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • Draw given angles and measure them in degrees. • Identify: angles at a point and one whole turn (360 degrees); angles at a point on a straight line and half a turn (total 180 degrees) other multiples of 90 degrees.	• Draw 2-D shapes using given dimensions and angles. • Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons. • *Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
Statistics	• Solve comparison, sum and difference problems using information presented in a line graph. • Complete, read and interpret information in tables including timetables.	• Illustrate and name parts of circles, including radius, diameter and circumference; know that the diameter is twice the radius. • Interpret and construct pie charts and line graphs and use these to solve problems. • Calculate the mean as an average.