Stonelow Junior School Progression of Skills – Mathematics

Place Value			
Year 3	**Year 4**	**Year 5**	**Year 6**
Recognise the place value of each digit in a 3-digit numbers (hundreds, tens and one) Read and write numbers up to 1000 in numerals and words. Compare and order numbers up to 1000	Recognise the place value of each digit in a 4-digit number (thousands, hundreds, tens and ones) Order and compare numbers beyond 1000	Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit	Read, write and compare numbers up to 10,000,000 and determine the value of each digit
Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more of less than a given number	Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more or less than a given number Count backwards through 0 to include negative numbers	Count forwards or backwards in context, count forwards and backwards with positive and negative numbers, including through 0.	Use negative numbers in context, and calculate intervals across zero
Identify, represent and estimate numbers using different representations.			
	Round any number to the nearest 10, 100 and 1000	Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000.	Round any whole number to a required degree of accuracy
	Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of 0 and place value.	Read Roman numerals to 1,000 (M) and recognise years written in Roman numerals.	
Solve number problems and practical problems involving these ideas	Solve number and practical problems that involve all of the above and with increasingly large positive numbers	Solve number and practical problems that involve all of the above	

Four Operations

	Year 3	Year 4	Year 5	Year 6
Mental calculation	Add and subtract numbers mentally, including • A 3-digit number and ones • A 3-digit number and tens • A 3-digit number and hundreds.	Recognise and use factor pairs and commutativity in mental calculations. Use place value, know and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 0 and 1; multiplying together 3 numbers.	Add and subtract mentally with increasingly large numbers Multiply and divide numbers mentally drawing upon known facts.	Perform mental calculations, including with mixed operations and large numbers
Formal/written methods	Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times a 1-digit number, using mental and progressing to formal written methods.	Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction where appropriate Multiply 2 and 3-digit numbers by a 1-digit number using formal written methods	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Multiply numbers up to 4 digits by a 1 or 2-digit number using a formal written method, including log 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.	Multiply multi-digit numbers up to 4 digits by a 2-digit whole number using the formal written method of long multiplication. Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. Divide numbers up to 4 digits by a 2-digit number using formal written method of short division where appropriate, interpreting remainders according to the context.

Multiplications tables knowledge	Recall multiplication and division facts for the 3, 4 and 8 multiplication tables.	Recall multiplication and division facts for multiplication tables up to 12 x 12	Identify multiples and factors, including finding all factor pairs or a number, and common factors or two numbers. Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers. Establish whether a number up to 100 is a prime and recall prime numbers up to 19. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000	Identify common factors, common multiples and prime numbers
			Use rounding to check answers to calculations and determine, in the context of a problem, levels or accuracy.	
				BODMAS/BIDMAS Use knowledge of order of operations to carry out calculations involving the four operations.
	Estimate and answer to a calculation and use inverse operations to check answers	Estimate and use inverse operations to check answers to a calculation		Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Problem solving	Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 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	Solve additions and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use a why. Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign. Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Solve problems involving addition, subtraction, multiplication and division.

Fractions

	Year 3	Year 4	Year 5	Year 6
Fractions	Count up and down in tenths; recognise that tenths arise from dividing 1-digit numbers or quantities by 10	Count up and down in hundredths; recognise that hundredths arise when diving an object by 1 hundred and diving tenths by 10.		
	Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators		Recognise mixed number and improper fractions and convert from one form to the other and write mathematical statements < 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$]	
	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators			
	Recognise and show, using diagrams, equivalent fractions with small denominators	Recognise and show, using diagrams, families of common equivalent fractions	Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.	
	Add and subtract fractions with the same denominator within 1 whole	Add and subtract fractions with the same denominator	Add and subtract fractions with the same denominator and denominators that are multiples of the same number.	Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
			Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.	Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, ¼ x ½ = $\frac{1}{8}$]
				Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
				Divide proper fractions by whole numbers [for example $\frac{1}{3} \div 2 = \frac{1}{6}$]
	Compare and order unit fractions, and fractions with the same denominators		Compare and order fractions whose denominators are all multiples of the same number.	Compare and order fractions, including fractions <1
Decimals				Identify the value of each digit in numbers given to 3 decimal places and multiply and divide numbers by 10, 100, 1000 giving answers up to 3 decimal places.
			Read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$]	

		Compare numbers with the same number of decimal places up to decimal places.	Read, write, order and compare numbers with up to 3 decimal places.	
				Multiply 1-digit numbers with up to 2 decimal places by whole numbers.
		Find the effect of dividing a 1 or 2-digit number by 10 or 100, identifying the value of the digits in the answer as ones, tenths and hundredths.		Use written division methods in cases where the answer has up to 2 decimal places.
		Round decimals with one decimal place to nearest whole number	Round decimals with 2 decimal places to the nearest whole number and to 1 decimal place.	
		Recognise and write decimal equivalents of any number of tenths or hundredths Recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$	Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents.	Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example $\frac{3}{8}$] Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
%			Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal.	
	Solve problems that involve all of the above	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. Solve simple measure and money problems involving fractions and decimals to two decimal places	Solve problems involving number up to 3 decimal places. Solve problems which require knowing percentage and decimal equivalents of 1/2 , ¼, $\frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.	Solve problems which require answers to be rounded to specified degrees of accuracy.

Measurement

	Year 3	Year 4	Year 5	Year 6
Length, Perimeter, Mass and Capacity	Measure, compare, add and subtract: lengths (m/cm/mm); mass (g/kg); volume/capacity (l/ml)			
	Measure the perimeter of simple 2-d shapes.	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.	Recognise that shapes with the same areas can have different perimeters and vice versa.
		Find the area of rectilinear shapes by counting squares	Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes.	Calculate the area of parallelograms and triangles
		Estimate, compare and calculate different measures, including money in pounds and pence		
			Estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water.	Recognise when it is possible to use a formulae for area and volume of shapes. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³) , and extending to other units [for example, mm³ and km³].
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, am/pm, morning, afternoon, noon and midnight.			
	Know the number of seconds in a minute and the numbers of days in each month, year and leap year.			
	Compare duration of events [for example to calculate the time taken by particular events or tasks.			

			Solve problems involving converting between units of time	
Money	Add and subtract amounts of money to give change, using both £ and p in practical contexts	Estimate, compare and calculate different measures, including money in pounds and pence		
Conversion		Convert between different units of measure [for example, kilometre to metre; hour to minute]	Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)	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 to up to three decimal places.
			Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. Solve problems involving converting between units of time	Convert between miles and kilometres
Problem solving				
			Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.

Geometry

	Year 3	Year 4	Year 5	Year 6
Position and Direction		Describe positions on a 2-D grid as coordinates in the first quadrant	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 a full coordinate grid (all four quadrants)
		Describe movements between positions as translations of a given unit to the left/right and up/down		Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.
		Plot specified points and draw sides to complete a given polygon		
Properties of Shapes	Draw 2-D and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	Identify 3-D shapes, including cubes and other cuboids, from 2-D representations Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	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 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 angles as a property of shape or a description of a turn Identify right angles, recognise that two right angles makes a half turn, three make a three quarters turn and 4 complete turn; identify whether angles are greater than or less than a right angle	Identify acute and obtuse angles and compare and order angles up to two right angles by size.	Know angles are measured in degree: 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) • Angles at a point on a straight line and ½ a turn (180) • Other multiples of 90	Recognise angles and where the meet at a point, are on a straight line, or are vertically opposite and find missing angles.
		Use properties of rectangles to deduce related facts and find missing lengths and angles.	
Identify horizontal and vertical lines and pairs or perpendicular and parallel lines.			
	Identify lines of symmetry in 2–D shapes presented in different orientations. Complete a simple symmetrical figure with respect to a specific line of symmetry.		

Statistics

Year 3	Year 4	Year 5	Year 6
Interpret and present data using bar charts, pictograms and tables	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	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.
Solve one-step and two-step questions [for example, 'how many more?' and 'How may fewer?'] using information presented in scaled bar charts and pictograms and tables.	Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.	Solve comparison, sum, difference problems using information presented in a line graph	

Ratio and Proportion

Year 3	Year 4	Year 5	Year 6
			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 [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
			Solve problems involving similar shapes where the scale factor is known or can be found.
			Solve problems involving unequal sharing and group using knowledge of fractions and multiples.

Algebra			
Year 3	**Year 4**	**Year 5**	**Year 6**
			Use simple formulae
			Generate and describe linear number sequences
			Express missing number problems algebraically
			Find pairs of numbers that satisfy and equation with two unknowns
			Enumerate possibilities of combinations of two variables.