St William of York Catholic Primary School

Progress in Skills and Knowledge: Mathematics

Skills/Knowledge	Nursery	Reception ELGs in Bold	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value	Take part in finger rhymes with numbers Develop counting- like behaviour, such as making sounds, pointing or saying some numbers in sequence Count in everyday contexts, sometimes skipping numbers- 1-2-3-5 Develop fast recognition of up to 3 objects without having to count them individually (subitising) Recite numbers past 5 Say one number for	Count objects, actions and sounds. Subitise Count beyond 10 Link the number symbol (numeral) with its cardinal number value. Compare numbers Understand the one more than/one less than relationship between consecutive numbers Have a deep understanding of numbers to 10, including the composition of each number Subitise to 5. Verbally count	Identify and represent numbers using concrete objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least. Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number. Given a number, identify one more and one less. Count to and across 100,	Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s (year 1). Identify, represent and estimate numbers using different representations, including the number line. Recognise the place value of each digit in a 2-digit number (10s, 1s). Compare and order numbers from 0 up to 100; use and = signs. Count in steps of 2, 3, and 5 from 0, and in	Recognise the place value of each digit in a three digit number (hundreds, tens, ones). Identify, represent and estimate numbers using different representations. Compare and order numbers up to 1,000. Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.	Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). Round any number to the nearest 10, 100 or 1,000. Count in multiples of 6, 7, 9, 25 and 1,000. Identify, represent and estimate numbers using different representations. Recognise the place value of each digit in a four-digit number (thousands,	Read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit. Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000. Read roman numerals to 1,000 (m) and recognise years written in roman numerals. Solve number problems and practical problems that involve all of the above. Interpret negative	Read, write, order and compare numbers up to 10 000 000 and determine the value of each integer. Round any whole number to a required degree of accuracy. Solve number and practical problems. Use negative numbers in context and calculate intervals across zero.

	each item in order 1,2,3,4,5 Know that the last number	to 20, recognizing 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**.**	forwards and backwards, beginning with 0 or 1, or from any given number. Identify and represent numbers using objects and pictorial representation s including the number line, and use the language of: equal to, more than, less than (fewer), most, least. Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s. Solve one-step problems involving multiplication and division, by calculating the answer using concrete	10s from any number, forward and backward. Use place value and number facts to solve problems. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. Solve problems with addition and subtraction: using concrete objects and pictorial representation s, including those involving numbers, quantities and measures.		hundreds, tens, and ones). Order and compare numbers beyond 1,000. Read roman numerals to 100 (i to c) and know that over time, the numeral system changed to include the concept of zero and place value. Count backwards through zero to include negative numbers.	numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.	

			objects, pictorial representations and arrays with the support of the teacher.					
Addition and Subtraction		Subitise. Understand the 'one more than/one less than' relationship between consecutive numbers. Explore the composition of numbers to 10. 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 facts.	Represent and use number bonds and related subtraction facts within 20. Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs. Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100. Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures. Add and subtract numbers using concrete objects, pictorial	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	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction. Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction). Add and subtract numbers mentally with increasingly large numbers	Solve addition and subtraction multi-step problems in context, deciding which operation and method to use.

			problems such as 7 = _ – 9. Read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs. Add and subtract 1-digit and 2-digit numbers to 20, including zero. Represent and use number bonds and related subtraction facts within 20. Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least.	representations, and mentally, including: a 2-digit number and 1s. Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 10s.	operations to check answers. Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.			

Multiplication and Division		Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.		Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher (year 1). Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs. Solve problems involving multiplication and division,	Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods. 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 that they	Recall multiplication and division facts for multiplication tables up to 12 x 12. Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. Know and use the vocabulary of prime numbers, prime factors and composite (non-prime numbers). Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes. Multiply and divide whole numbers and those involving	Multiply multi-digit numbers up to 4 digits by a 2-digit whole number, using formal written methods. Divide numbers up to 4 digits by a 2-digit number using the formal written method and interpreting remainders where appropriate. Identify common factors, common multiples and prime numbers. Recognise and use square and cube numbers. Use knowledge of orders of operations to carry out calculations.

				using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	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. Write and calculate mathematical statements for multiplication and division using the multiplication tables that they	correspondence problems such as n objects are connected to m objects. Multiply two-digit and three-digit numbers by a one-digit number using formal written methods. Recognise and use factor pairs and commutativity in mental calculations.	decimals by 10, 100 and 1000. 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.	Perform mental calculations. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.

					know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.			
Fractions, Decimals and Percentages		Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.	Recognise, find and name a half as one of two equal parts of an object, shape or quantity.	(Year 1) recognise, find and name a half as one of two equal parts of an object, shape or quantity. Recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity. Write simple fractions for example, 1/2 of 6 = 3 and recognise the equivalence of 2/4 and ½.	Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators. 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. Add and subtract fractions with the same denominator within one whole.	Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten. Recognise and show, using diagrams, families of common equivalent fractions. Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide	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. Compare and order fractions whose denominators are all multiples of the same number. Add and subtract fractions with	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. Compare and order fractions. 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.

					Solve problems that involve all of the above.	quantities, including non-unit fractions where the answer is a whole number. 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. Recognise and write decimal equivalents of any number of tenths or hundredths. Find the effect of dividing a one- or twodigit	the same denominator and denominators that are multiples of the same number. Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Read, write, order and compare numbers with up to three decimal places Read and write decimal numbers as fractions. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Read, write, order and compare	Multiply simple pairs of fractions, writing the answer in its simplest form. Divide proper fractions by whole numbers. Use written division methods in cases where the answer has up to 2dp. Compare and order fractions. Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. Associate a fraction with division and calculate decimal

						number by 10 and 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 ¼, ½, ¾ Solve simple measure and money problems involving fractions and decimals to two decimal places.	numbers with up to three decimal places. Round decimals with two decimal places to the nearest whole number and to one decimal place. 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 which require knowing percentage and decimal equivalents. Solve problems involving number up to	fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]. 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. Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. Compare and order fractions, including fractions > 1.

							three decimal places.	
Geometry		Select, rotate and manipulate shapes to develop spatial reasoning skills. Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can. Continue, copy and create repeating patterns.	Recognise and name common 2-D and 3-D shapes, including: 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]. Describe position, direction and movement, including whole, half, quarter and three-quarter turns.	Compare and sort common 2D and 3D shapes and everyday objects. Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line. Order and arrange combinations of mathematical objects in patterns and sequences. Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces. Use mathematical vocabulary to	Recognise angles as a property of shape or a description of a turn. Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle. Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them.	Identify acute and obtuse angles and compare and order angles up to two right angles by size. Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. Identify lines of symmetry in 2D shapes presented in different orientations. Complete a simple symmetric figure with respect to a specific line of symmetry. Describe positions on a 2D grid as coordinates in	Identify: – angles at a point and one whole turn (total 360°) – angles at a point on a straight line and 1/2 a turn (total 180°) and other multiples of 90. Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees (°). Use the properties of rectangles to deduce related facts and find missing lengths and angles. Distinguish between regular and irregular	Describe positions on the full co-ordinate grid. Draw and translate simple shapes on the coordinate plane, and reflect them in the axes. Recognise and classify angles where they meet at any point. 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,

				describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).	Identify horizontal and vertical lines and pairs of perpendicular and parallel lines. Draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them.	the first quadrant. Describe movements between positions as translations of a given unit to the left/right and up/down.	polygons based on reasoning about equal sides and angles. Identify 3D shapes, including cubes and other cuboids, from 2D representations. 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.	and regular polygons. Find unknown angles. Illustrate and name parts of a circle. Know that radius is ½ diameter and diameter is x2 radius. Recognise, describe and build 3D shapes from 2D representations. Recognise, describe and build simple 3-D shapes, including making nets.
Measures		Compare length, weight and capacity.	Compare, describe and solve practical problems for: lengths and heights [for example, long/short, longer/shorter,	Recognise and use signs for pounds (£) and pence (p); combine amounts to make a particular value.	Add and subtract amounts of money to give change, using both £ and p in practical contexts.	Convert between different units of measure [for example, kilometre to metre; hour to minute].	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres.	Use, read, write and convert between standard units. Convert measures of length, mass,

			tall/short, double/half]. Measure and begin to record the following: lengths and heights. Measure and begin to record the following: mass/ weight. Compare, describe and solve practical problems for: capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]. Measure and begin to record the following: capacity and volume. Compare, describe and solve practical problems for: capacity and volume [for example, full/empty, more than, less	Find different combinations of coins that equal the same amounts of money. Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change. Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels.	Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step questions [for example, 'how many more?' and 'how many fewer?'] using information presented in scaled bar charts and pictograms and tables. Measure, compare, add and subtract: lengths (m/ cm/mm); mass (kg/g); volume/capacity (l/ml). Measure the perimeter of simple 2-d shapes. Know the number of seconds in a minute and the number of days	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. Find the area of rectilinear shapes by counting squares. Estimate, compare and calculate different measures, including money in pounds and pence. Convert between different units of measure [for example, kilometre to metre; hour to minute).	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. 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 all four operations to solve problems involving	volume and time. Use decimal notation up to 3 d.p. Convert between miles and km. Calculate area and perimeter, including parallelograms and triangles. 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. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres

			than, half, half full, quarter. Sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]. Recognise and use language relating to dates, including days of the week, weeks, months and years. Tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Tell the time to the hour and half past the hour and draw	Compare and order lengths, mass, volume/ capacity and record the results using >, < and =. (Year 1) tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. Know the number of minutes in an hour and the number of hours in a day. Compare and sequence intervals of time.	in each month, year and leap year. 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. Tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks. Compare durations of events (for example to calculate the time taken by		measure [for example, length, mass, volume, money] using decimal notation, including scaling. 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. Estimate volume [for example, using 1 cm cubed blocks to build cuboids (including cubes)] and capacity [for example, using water].	(m3), and extending to other units [for example, mm3 and km3].

			the hands on a clock face to show these times. Measure and begin to record the following: time (hours, minutes, seconds). Recognise and know the value of different denominations of coins and notes.		particular events or tasks).			
Statistics		Identify and represent numbers with objects and pictorial representations including introduction to a number line		Interpret and construct simple 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.	Interpret and present data using bar charts, pictograms and tables. Solve one-step and two-step questions [for example, 'how many more?' and 'how many fewer?'] using information presented in scaled bar charts and 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,	Complete, read and interpret information in tables, including timetables. Solve comparison, sum and difference problems using information presented in a line graph.	Calculate and interpret the mean as an average. Interpret and construct pie charts and line graphs and use these to solve problems.

						pictograms, tables and other graphs.		
Ratio and Proportion								Solve problems involving the relative sizes of two quantities where missing values can be found with multiplication and division facts. Solve problems involving similar shapes where the scale factor is known or can be found.
Algebra								Generate and describe linear number sequences. Use simple formulae Find pairs of numbers that satisfy an equation with two unknowns. Express missing number problems algebraically.