Progression of Mathematics in St Pius X
2020-2021

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Curriculum Intent of Mathematics in St Pius X

In St Pius X the use of the Power Maths curriculum enables children to have an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. This is achieved through the use of a model which enables concrete, pictorial and abstract learning within all years of the curriculum. Furthermore, rich connections across mathematical ideas enable children to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. The most vital aspect of the curriculum is to ensure children are engaged and drive the learning forward through discussion with their peers, not just those of the same ability, this gives every child a sense of success and builds their confidence. This aspect is achieved through teachers sharing problems with the children and giving them time to talk and learn from their mistakes – therefore deepening their understanding of a concept whilst reinforcing the learning objective. This approach to the delivery of mathematics enables staff to identify children who need support in every lesson and put in place same-day interventions and additional support in class on a daily basis to consolidate learning.

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number and Place Value	Children count reliably with numbers from 1 to 20, place them in order Children explore characteristics of everyday objects Children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems	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 Read and write numbers from 1 to 20 in numerals and words Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens Count, read and write numbers to 100 in numerals; count in multiples of 2s, 5s and 10s	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 10s from any number, forward and backward Use place value and number facts to solve problems	Recognise the place value of each digit in a three digit number (hundreds, tens, ones) Read and write numbers up to 1,000 in numerals and in words 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 Solve number problems and practical problems involving these ideas	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 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 Solve number and practical problems that involve all of the above and with increasingly large positive numbers Count backwards through zero to include negative numbers Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	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 Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000 Solve number problems and practical problems that involve all of the above 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 numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero Solve number problems and practical problems that involve all of the above	Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit Solve number and practical problems that involve all of the above Round any whole number to a required degree of accuracy Use negative numbers in context, and calculate intervals across zero

Addition and subtraction	Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer	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 problems such as 7 = _ – 9. Add and subtract one-digit and two-digit numbers to 20, including zero	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot 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 representations, and mentally, including: a 2-digit number and 1s Count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward and backward Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 10s Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: two 2-digit numbers Solve problems with addition and subtraction: applying their increasing knowledge of mental and written methods Add and subtract numbers using concrete objects, pictorial representations and mentally, including: adding three 1-digit numbers Use place value and number facts to solve problems	Add and subtract numbers mentally, including: a three-digit number and ones, a three-digit number and tens, a three-digit number and hundreds Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction 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	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate Solve number and practical problems that involve all of the above and with increasingly large positive numbers Estimate and use inverse operations to check answers to a calculation 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) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Add and subtract numbers mentally with increasingly large numbers Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Estimate and use inverse operations to check answers to a calculation	Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Use their knowledge of the order of operations to carry out calculations involving the four operations Perform mental calculations, including with mixed operations and large numbers Solve problems involving addition and subtraction Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Multiplication and division	They solve problems, including doubling, halving and sharing	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	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, 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	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 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	Recall multiplication and division facts for multiplication tables up to 12 × 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 converting from hours to minutes; minutes to seconds; years to months; weeks to days. Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign Multiply two-digit and three-digit numbers by a one-digit number using formal written layout Recognise and use factor pairs and commutativity in mental calculations	Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers Establish whether a number up to 100 is prime and recall prime numbers up to 19 Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers Multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 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	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context Divide numbers up to 4 digits by a two-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 Identify common factors, common multiples and prime numbers Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3) (Year 5) Use their knowledge of the order of operations to carry out calculations involving the four operations Perform mental calculations, including with mixed operations and large numbers Solve problems multiplication and division Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

						method of short division and interpret remainders appropriately for the context	

Fractions (including decimals and percentages)		Recognise, find and name a half as one of two equal parts of an object, shape or quantity Recognise, find and name a quarter as one of four 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 **Non-statutory guidelines: Pupils should count in fractions up to 10, starting from any number**	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 Compare and order unit fractions, and fractions with the same denominators Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators Recognise and show, using diagrams, equivalent fractions with small denominators Add and subtract fractions with the same denominator within one whole (for example, 5/7 + 1/7 = 6/7) Solve problems that involve all of the above	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 quantities, including non-unit fractions where the answer is a whole number Add and subtract fractions with the same denominator 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 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths Recognise and write decimal equivalents of any number of tenths or hundredths Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten Find the effect of dividing a one- or two digit 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 Recognise and write decimal equivalents to 1/4, 1/2, ¾ Solve simple measure and money problems involving	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 and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5] Compare and order fractions whose denominators are all multiples of the same number 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, supported by materials and diagrams Read, write, order and compare numbers with up to three decimal places Read and write decimal numbers as fractions [for example, = 71/100 Solve problems involving number up to three decimal places Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents 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 of	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 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, 1/4 × 1/2 = 1/8) Divide proper fractions by whole numbers (for example, 1/3 ÷ 2 = 1/6) Use their knowledge of the order of operations to carry out calculations involving the four operations Use written division methods in cases where the answer has up to two decimal places 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 fraction equivalents [for example, 0375] for a simple fraction [for example, 3/8] Multiply one-digit numbers

					fractions and decimals to two decimal places	1/2 , 1/4 , 1/5 , 2/5 , 4/5 and those fractions with a denominator of a multiple of 10 or 25 Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	with up to two decimal places by whole numbers Solve problems which require answers to be rounded to specified degrees of accuracy Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison

Geometry – properties of shape	Children explore characteristics of everyday objects and shapes and use mathematical language to describe them Children recognise, create and describe patterns	Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. Recognise and create repeating patterns with objects and with shapes	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 Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces	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 horizontal and vertical lines and pairs of perpendicular and parallel lines	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	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°) –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 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 Identify 3D shapes, including cubes and other cuboids, from 2D representations	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 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 Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius Recognise, describe and build simple 3-D shapes, including making nets Identify 3-D shapes, including cubes and other cuboids, from 2-D representations

Geometry – position and direction		Describe position, direction and movement, including whole, half, quarter and three-quarter turns	Order and arrange combinations of mathematical objects in patterns and sequences Order and arrange combinations of mathematical objects in patterns and sequences Use mathematical vocabulary to 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)		Describe positions on a 2D grid as coordinates in the first quadrant 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	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 simple shapes on the coordinate plane, and reflect them in the axes

Measurement		Compare, describe and solve practical problems for: lengths and heights [for example, long/short, longer/shorter, tall/short, double/half] Measure and begin to record the following: lengths and heights Compare, describe and solve practical problems for: mass/weight [for example, heavy/light, heavier than, lighter than] 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 Sequence events in chronological order using language [for example, before and a□er, next, first, today, yesterday, tomorrow, morning, a□ernoon 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. Measure and begin to record the following: time (hours, minutes, seconds) Compare, describe and solve practical problems for time [for example, quicker, slower, earlier, later] Recognise and know the value of different denominations of coins and notes	Recognise and know the value of different denominations of coins and notes (year 1) Recognise and use signs for pounds (£) and pence (p); combine amounts to make a particular value Find di□erent 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 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 Tell and write the time to five minutes, including quarter past/to 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	Add and subtract amounts of money to give change, using both £ and p in practical contexts **Adding and subtracting money** **Converting between pounds and pence** 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 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 particular events or tasks)	Convert between different units of measure [for example, kilometre to metre; hour to minute] 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 Solve simple measure and money problems involving fractions and decimals to two decimal places Convert between different units of measure [for example, kilometre to metre; hour to minute] 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 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 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 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	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 Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate Convert between miles and Kilometres 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 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]

Statistics			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 Ask and answer questions about totalling and comparing categorical data	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, pictograms, tables and other graphs	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

Algebra							Generate and describe linear number sequences Use simple formulae Express missing number problems algebraically Find pairs of numbers that satisfy an equation with two unknowns Enumerate possibilities of combinations of two variables

Ratio and proportion							Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples 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