Curriculum progression map of knowledge and skills

Maths

School Vision	School Aims		Rights Respecting School	
We all work together to achieve the best we can We learn in fun and challenging ways We have a happy, safe and exciting school to make us proud We value and care for everyone and everything	Children are successful at Tillingbourne School because they are: Happy Aspirational Curious Resilient Confident Responsible	<u>Our 3 Focus Rights</u> The right to learn The right to be heard The right to be me	<u>Our school responsibilities</u> Always do our best Respect the rights of others Look after our learning environment and the world around us	

	Topic	Knowledge and calculation skills	Vocabulary	Mental maths and counting	Problem solving and reasoning
Year 6	Number – Place Value	• read, write, order and compare numbers up to 10,000,000 and determine the value of each digit • round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across 0 • solve number and practical problems that involve all of the above		Counting in a range of increments, including into negative numbers	Nice or Nasty Digit Cards (WR) Ordering six-digit numbers (WR) ISeeProblem Solving – Rounding Money Rounding Circle Game Negative numbers – office floors (WR) Negative numbers – counting in tens (WR)
	Number – Addition Subtraction Multiplication Division	• 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 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 two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the 4 operations • 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	Order of operations factor multiple prime square number product remainder	add and subtract numbers mentally with increasingly large numbers perform mental calculations, including with mixed operations and large numbers use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy Times table recall up to 12 x 12	Reach 100 (add) Palindromes Investigation (add) Letter calculations (add) ISeeProblemSolving – Sum and difference of two numbers ISeeProblemSolving – Sum and difference of four numbers ISeeProblemSolving – Factors of 532 ISeeProblemSolving – Missing Digits (mult) Addition pyramids Zids and Zods (Mult) A Bit Fishy (Mult) Times Table Codebreaker Factor Pairs (Div – WR) Albert Square Q Millennium time Q
	Number - Fractions	• use common factors to simplify fractions; use common multiples to express fractions in the same denomination • compare and order fractions, including fractions >1	simplify	Counting in fractions	- Mixed and Improper Fractions codebreaker - Crazy Rectangles - Andy's Marbles (Nrich)

		• add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$] • divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$] • associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]			- Fractions countdown challenge
	Geometry – position and direction	• describe positions on the full coordinate grid (all 4 quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes	quadrant		
	Number – Decimals and percentages	• identify the value of each digit in numbers given to 3 decimal places and multiply and divide 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 •		recall and use equivalences between simple fractions, decimals and percentages, including in different contexts	Decimal calculation patterns (Collins) Converting unitary fractions (Collins)
	Number – Algebra	• use simple formulae • generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy an equation with 2 unknowns • enumerate possibilities of combinations of 2 variables	expression formula sequence		
	Measure – Converting units	• solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate • 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 3 decimal places • convert between miles and kilometres			
	Measure – Perimeter Area Volume	• recognise that shapes with the same areas can have different perimeters and vice versa		Counting in different increments	

		• 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 (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3]			
	Number – Ratio	• solve problems involving the relative sizes of 2 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 grouping using knowledge of fractions and multiples	Proportion Scale		
	Geometry – Properties of shapes	• 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 where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles	Circumference intersecting intersection Plane Tangram dodecahedron		
	Statistics	• interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average	Mean Average median distribution		
Year 5	Number – 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 up to 1,000,000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through 0	Millions, hundred thousand, Powers Ascending Descending	Counting in different increments	I see problem solving task 1 I see reasoning pg.12 Group works – negative numbers

		• 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			
	Number – Addition and subtraction	• 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 • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why	Efficient methods	add and subtract numbers mentally with increasingly large numbers use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	Two two four – nrich Nrich – always sometimes never (homework) Four boxes investigation
	Number - Multiplication and division	• identify multiples and factors, including finding all factor pairs of a number, and common factors of 2 numbers • know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers • establish whether a number up to 100 is prime and recall prime numbers up to 19 • multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally, drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1,000 • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • solve problems involving multiplication and division, 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	Factor Prime number Square number Cube number Multiple Composite number Remainder Divisor Dividend Product	Times table recall 12 x 12 Counting backwards and forwards in a range of multiples	I see problem solving How many ways? Missing digits

		• solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates			
	Statistics	• solve comparison, sum and difference problems using information presented in a line graph • Complete, read and interpret information in tables, including timetables.	data interval line graph scatter graph line of best fit correlation average two-way tables increase decrease		
	Measure - Perimeter Area	• 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 • Solve problems involving converting between units of time • Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.		Counting in different increments	
	Number - Fractions	• Compare and order fractions whose denominators are all multiples of the same number • Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths. • Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements • 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. • of 10 or 25.	Common denominator Common multiple Proper fraction Improper fraction Mixed number Unit fraction Integer Whole	Counting in fractions	
	Number – Decimals and percentages	• Read and write decimal numbers as fractions [for example, 0.71 = 100 71] • 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 • Read, write, order and compare numbers with up to three decimal places.	Tenths, hundredths, thousandths Whole Percentage Decimal place	Number bonds to a whole	

		• Solve problems involving number up to three decimal places • 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 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple			
	<u>Geometry</u> – Properties of shapes	• Identify 3-D shapes, including cubes and other cuboids, from 2-D representations. • Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. • Draw given angles, and measure them in degrees (o) • 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° • 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.	Reflex Dimensions		
	<u>Measure –</u> Converting units	• Convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints	Metric Inches Pounds		
	<u>Measurement</u> Volume	• Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water] • Solve problems involving converting between units of time • Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	Cubed 3 Volume Space Scale Pounds Pence Decimal Decimal place		
Year 4	<u>Number</u> – Place Value	• Find 1000 more or less than a given number • Count backwards through zero to include negative numbers • Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)	Minus Negative Thousands Estimate Round Nearest Numerals Integer (whole number)	Count in multiples of 6, 7, 9, 25 and 1000 Find 1000 more or less than a given number	Reasoned rounding Four digit targets

		• Order and compare numbers beyond 1000 • Identify, represent and estimate numbers using different representations • Round any number to the nearest 10, 100 or 1000 • Solve number and practical problems that involve all of the above and with increasingly large positive numbers • 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.	part whole model bar model	Count backwards through zero to include negative numbers	
	<u>Number –</u> Addition and subtraction	• Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. • 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.		Estimate and use inverse operations to check answers to a calculation	Bordering 10 Position digits Make a total Position digits to subtract How many ways Palindrome (PPA)
	<u>Number -</u> Multiplication and division	• Recognise and use factor pairs and commutativity in mental calculations • Multiply 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 and harder correspondence problems such as n objects are connected to m objects.	Multiply Divide Product Factors Multiples Short method Grid method Expanded method Short division divisor	Recall multiplication and division facts for multiplication tables up to 12 × 12. Use place value facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	Largest product All the digits – nrich Matchsticks Division in context
	<u>Measurement</u> Length, perimeter and area	• 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	Length Area Perimeter Distance Kilometre Metre cm Rectilinear Shape	Counting in different increments	
	<u>Number</u> - Fractions	• Recognise and show, using diagrams, families of common equivalent fractions • Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.	Thirds Sixth Eights Equivalent	Counting in fractions	Fractions on a line

		• 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 • Solve simple measure and money problems involving fractions and decimals to two decimal places.			
	<u>Number</u> – Decimals and percentages	• Recognise and write decimal equivalents of any number of tenths or hundredths. • Recognise and write decimal equivalents to ¼, ½, 3/4. • 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. • Round decimals with one decimal place to the nearest whole number. • Compare numbers with the same number of decimal places up to two decimal places.	Decimals Decimal places Decimal point Tenths Hundredths Greater than Less than Whole number	Counting in different increments	
	<u>Measurement</u> Money	• 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.		Counting in different increments	
	<u>Measurement</u> Time	• Read, write and convert time between analogue and digital 12- and 24-hour clocks • Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	24 hour clock 12 hour clock convert 5 minute increments		Nrich investigations
	Statistics	• 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.	Discrete Axis/axes Intervals Pictogram Bar chart Graph Tally Key Data Frequency table Plotting		Making judgements
	<u>Geometry</u>- Properties of shape	• Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • Identify acute and obtuse angles and compare and order angles up to two right angles by size • Identify lines of symmetry in 2-D shapes presented in different orientations	Quadrilateral 3D 2D Triangles Isosceles Equilateral Scalene Acute Obtuse Right-angle Degrees Symmetry		Cube-net investigation (DT) Angle times

		• Complete a simple symmetric figure with respect to a specific line of symmetry.	Vertices Edges Sides		
	<u>Geometry</u>- Position and direction	• Describe positions on a 2-D grid as coordinates in the first quadrant. • Describe movements between positions as translations of a given unit to the left/right and up/down. • Plot specified points and draw sides to complete a given polygon.	Position Translate Axis/axes (x,y) Grid Coordinates Plot Rotate Move Reflect Left Right Direction		White Rose problems
year 3	<u>Number</u> – Place Value	• Recognise the place value of each digit in a three-digit number (hundreds, tens, ones) • Compare and order numbers up to 1000 • Identify, represent and estimate numbers using different representations. • Read and write numbers up to 1000 in numerals and in words • Solve number problems and practical problems involving these ideas.	place value ones/tens/hundreds equal/same as odd even calculation number sentence identify represent recognise partition value digit number amount dienes (base 10) numicon hundreds, tens, ones column part whole model bar model greater than/more than/less than compare order number line estimate explain reasoning examples pattern true false diagram Roman Numerals More than, less than consecutive	count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	I see reasoning: 'make a 3 digit number'
	<u>Number –</u> 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	layout written method mental column addition column subtraction working systematically strategy combination	add and subtract numbers mentally, including: a three-digit number and ones, a three-	empty box questions using inverse addition pyramids palindromic puzzle investigation

		• Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.	operation number line **addition**: add sum plus total altogether exchange units inverse predict **subtraction**: minus subtract take away difference between less than	digit number and tens, a three-digit number and hundreds	3 consecutive numbers investigation spot and explain the mistakes subtraction pyramids **Christmas**: Dressing Elves: Find all the possibilities
	<u>Number -</u> 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. • 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	**multiplication**: multiply times groups of lots of equal groups repeated addition array grid method double **division**: divide share chunking fact box remainder factor half **Sentence stems:** I noticed that… If … then … I already know… It could be .. because… This is different because… This is the same because.. This is true here because… I wonder whether… This is always true because…	Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables–	I see reasoning: solve multiplication reasoning problems x 2 spot and explain the mistake multiplication Ip, Dip investigation
	<u>Measurement</u> Money	• Add and subtract amounts of money to give change, using both £ and p in practical contexts	pounds pence coin note convert change	Counting in different increments	converting between pounds and pence

	<u>Measurement</u> Length and perimeter	• Measure the perimeter of simple 2-D shapes • Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	Cm Meter Ruler Measure Accurate Kilogram gram	Counting in different increments	
	<u>Measurement</u> 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. • Compare durations of events [for example to calculate the time taken by particular events or tasks].	clock analogue digital hour minute second hand o'clock half past quarter to quarter past to past am pm morning afternoon midnight noon day – today/tomorrow/yesterday week month year season leap year duration		
	<u>Number</u> - 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, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators • 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 • Add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] • Compare and order unit fractions, and fractions with the same denominators	fraction equal whole half quarter eighths shape object equivalent third tenths numerator denominator		explain how you would find half of the object problem solving: order fractions of animals investigation: find fractions of a shape

		• Solve problems that involve all of the above.			
	Geometry- Properties of shape	• Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them. • 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. • Identify horizontal and vertical lines and pairs of perpendicular and parallel lines	2D – two- dimensional oval circle triangle rectangle square kite pentagon hexagon heptagon octagon nonagon decagon cube cuboid sphere cone cylinder side corner vertices length properties symmetry – line of pair equilateral regular irregular polygon quadrilateral angle right angle acute obtuse turn net construct parallel perpendicular vertical horizontal		
	Statistics	• 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.	data graph bar graph pictogram axis table chart collect key present scale		Will add in for next year.

			interpret survey most popular least popular label title categories tally		