Coteford Junior School Progression in Mathematics

Essential characteristics of mathematicians:

- An understanding of the important concepts and an ability to make connections within mathematics.
- A broad range of skills in using and applying mathematics.
- Fluent knowledge and recall of number facts and the number system.
- The ability to show initiative in solving problems in a wide range of contexts, including the new or unusual.
- The ability to think independently and to persevere when faced with challenges, showing a confidence of success.
- The ability to embrace the value of learning from mistakes and false starts.
- The ability to reason, generalise and make sense of solutions.
- Fluency in performing written and mental calculations and mathematical techniques.
- A wide range of mathematical vocabulary.
- A commitment to and passion for the subject.

Range of Coverage	Year 3	Year 4	Year 5	Year 6
	Number and place value Addition and subtraction Multiplication and division Fractions Measurement Geometry – properties of shapes Statistics	Number and place value Addition and subtraction Multiplication and division Fractions (including decimals) Measurement Geometry – properties of shapes Geometry – position and direction Statistics	Number and place value Addition and subtraction Multiplication and division Fractions (including decimals and percentages) Measurement Geometry – properties of shapes Geometry – position and direction Statistics	Number and place value Addition and subtraction Multiplication and division Fractions (including decimals and percentages) Ratio and proportion Algebra Measurement Geometry – properties of shapes Geometry – position and direction Statistics

Intent

At Coteford Junior School, we intend for all pupils to experience an inspiring and engaging mathematics curriculum, taught by highly enthusiastic staff, which sparks curiosity and excitement and which nurtures confidence in maths. We aim for all pupils to have access to a maths curriculum, which meets the needs of all learners and equips them with the mathematical skills necessary for them to succeed on whichever path they follow. We want all pupils to develop a positive 'can do' attitude to maths and support all children to become mathematicians. Children need to be able to make rich connections across the areas of maths and use their knowledge in other subjects. Our intent is for every child to reach their full potential in mathematics and for them to leave our care as able and independent mathematicians, with the confidence and skills required to calculate fluently, reason confidently and solve problems using a range of effective and efficient strategies. They will be thoroughly prepared in all aspects of mathematics and fully equipped for the next step in their educational journey.

Implementation

Planning: All year groups have their own medium term planning document, which outlines the objectives from the National Curriculum for Mathematics document as well as having progression of skills clearly mapped out for each objective. In addition, there are more detailed progression documents for each strand of mathematics, which run alongside this. Staff also refer to the calculation policy when teaching formal methods, understanding that sometimes children find their own efficient methods along the way.

Lessons:
Maths is taught for at least one hour each day. Children are taught within their own mixed-ability class groups. At the start of each new topic, key vocabulary is introduced and revisited regularly to develop language acquisition, embedding as the topic progresses. Teachers employ a variety of teaching styles and opportunities for children to learn and develop their mathematical skills and competencies. The main aim of all lessons is to develop children's knowledge, understanding and skills, applying these to a variety of contexts. One of the key elements in lessons throughout the school is the development of mental calculation strategies alongside developing written calculation strategies. Teachers promote and encourage pupils to work collaboratively, as well as independently, and provide excellent modelling of all mathematical processes and concepts as part of everyday teaching. We employ a quality first teaching approach for all and identify early which pupils require additional support to succeed. We also identify those children who flourish in maths and offer additional challenges and opportunities to deepen their understanding of the subject. Teachers actively mark through the lesson to provide immediate feedback and intervention where needed. Cross-curricular links are made where they are meaningful. Resources are readily available to assist demonstration of securing a conceptual understanding of the different skills appropriate for each year group.

Assessment:

- Teachers and teaching assistants actively assess daily and provide immediate feedback to move learning forwards.
- Marking and feedback is given on children's learning in line with our feedback policy.
- All feedback is used to inform future planning.
- Mini plenaries are used effectively to address common misconceptions identified by active marking.
- End of unit assessments are completed at the end of each topic.
- QCA tests are administered in spring and summer term for Years 3-5. Year 6 use regular SATs style assessments.
- Book and planning scrutinies are carried out each term.

Extra opportunities:
Some pupils receive additional support to try to catch up/fill gaps from previously missed learning due to COVID or SEND. These sessions are taught by teachers or by highly skilled TAs who have received training in order to do this. Weekly homework is sent home with pupils which supports the learning that week and weekly times tables practise is always part of this homework. Good use is made of 'Times Table Rock Stars' both within lessons and as part of home learning.

Impact
A love of mathematics across the school will be instilled and, through pupil voice interviews, children will be able to talk confidently and enthusiastically about their learning. They will also show confidence in believing that they will achieve. They will be able to understand the context in which maths is being taught and relate this to real life purposes. Children will demonstrate that they have mastered mathematical concepts or skills by showing their understanding in a variety of ways, using mathematical language to explain their ideas and will be able to apply the concept to new problems in unfamiliar situations. They will also be able to show resilience when tackling problems. Children will demonstrate a quick recall of facts and procedures. This includes the recollection of the times table. All children will be able to reach their full potential.

Progression Maps

Place Value

Counting					
Year 1	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number			count backwards through zero to include negative numbers **(to be introduced in Year 3 during weather topic and then consolidated in year 4)**	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero	use negative numbers in context, and calculate intervals across zero
count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100 count up and down in tenths	count in multiples of 6, 7, 9, 25 and 1000 count up and down in hundredths	count forwards or backwards in steps of powers of 10 for any given number up to 1000 000	
given a number, identify one more and one less		find 10 or 100 more or less than a given number	find 1000 more or less than a given number		
Comparing					
use the language of: equal to, more than, less than (fewer), most, least	compare and order numbers from 0 up to 100; use <, > and = signs	compare and order numbers up to 1000	order and compare numbers beyond 1000 compare numbers with the same number of decimal places up to two decimal places (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers)
Identifying, representing and estimating numbers					
Identify and represent numbers using objects and pictorial representations including the number line	identify, represent and estimate numbers using different representations, including the number line	identify, represent and estimate numbers using different representations	identify, represent and estimate numbers using different representations		

Reading and writing numbers (including Roman Numerals)					
read and write numbers from 1 to 20 in numerals and words.	read and write numbers to at least 100 in numerals and in words	read and write numbers up to 1000 in numerals and in words		read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Comparing 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 **(teach through discrete activities & History)**	read Roman numerals to 1 000 (M) and recognise years written in Roman numerals.	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Understanding Place Value)
Understanding Place Value					
	recognise the place value of each digit in a two-digit number (tens, ones)	recognise the place value of each digit in a three-digit number (hundreds, tens, ones) Extend to four digit **(thousands, hundreds, tens, and ones)**	recognise the place value of each digit in a four-digit number **(Extend to 10,000 and 100,000 where possible)** 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 units, tenths and hundredths (copied from Fractions)	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (copied from Fractions)	read, write, order and compare numbers up to 10 000 000 and determine the value of each digit (appears also in Reading and Writing Numbers) identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places (copied from Fractions)

Rounding					
		Introduce rounding to the nearest 10 & 100 in Year 3	round any number to the nearest 10, 100 or 1 000 round decimals with one decimal place to the nearest whole number (copied from Fractions)	round any number up to 1 000 000 to the nearest 10, 100, 1 000, 10 000 and 100 000 round decimals with two decimal places to the nearest whole number and to one decimal place (copied from Fractions)	round any whole number to a required degree of accuracy solve problems which require answers to be rounded to specified degrees of accuracy (copied from Fractions)
Solving Problems					
	use place value and number facts to solve problems	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 problems and practical problems that involve all of the above	solve number and practical problems that involve all of the above

Addition and Subtraction

Number bonds					
represent and use number bonds and related subtraction facts within 20	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (consolidation)	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (consolidation)	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (consolidation)	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (consolidation)
Mental Calculations					
add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens	add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds	Teach strategies for aiding addition and subtraction (near doubles, +/- 9 etc) – consolidation	add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers

	* two two-digit numbers adding three one-digit numbers	Teach strategies for aiding addition and subtraction (near doubles, +/- 9 etc)			
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot	show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot (consolidation) Understand equals as meaning 'the same as' – balancing equations		Introduce where possible: use their knowledge of the order of operations to carry out calculations involving the four operations	use their knowledge of the order of operations to carry out calculations involving the four operations
Written methods					
read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)		add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction	add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) decimals – introduce	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) decimals (consolidation)
Estimating, checking and inverse operations					
recognise and use the inverse relationship between addition and	estimate the answer to a calculation and use inverse	estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the	use estimation to check answers to calculations and determine, in the	

subtraction and use this to check calculations and solve missing number problems.	operations to check answers		context of a problem, levels of accuracy	context of a problem, levels of accuracy.	
Problem solving					
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9	solve problems with addition and subtraction: * using concrete objects and pictorial representations, including those involving numbers, quantities and measures * applying their increasing knowledge of mental and written methods solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from Measurement)	solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction	solve addition 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 and why	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

Multiplication and Division

Multiplication and division facts					
count in multiples of twos, fives and tens (copied from Number and Place Value)	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward (copied from Number and Place Value)	count from 0 in multiples of 4, 8, 50 and 100 (copied from Number and Place Value)	count in multiples of 6, 7, 9, 25 and 1 000 (copied from Number and Place Value)	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 (copied from Number and Place Value)	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 (copied from Number and Place Value) (consolidation)

	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 2, 3, 4 , 5, 8 and 10 multiplication tables	recall multiplication and division facts for multiplication tables up to 12 × 12	recall multiplication and division facts for multiplication tables up to 12 × 12 (consolidation)	Use knowledge of place value and multiplication facts to work out decimal multiplication and division facts
Mental Calculation					
		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 (appears also in Written Methods)	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	multiply and divide numbers mentally drawing upon known facts	perform mental calculations, including with mixed operations and large numbers
	show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot	multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 – not until Year 5 but difficult to teach converting measures without it so suggest introducing without decimals initially	recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers) multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 – not until Year 5 but difficult to teach converting measures without it so suggest continuing with in year 4	multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^{3}/_{8}$) (copied from Fractions)
Written Calculations					
	calculate mathematical statements for	write and calculate mathematical statements	multiply two-digit and three-digit numbers by	multiply numbers up to 4 digits by a one- or	multiply multi-digit numbers up to 4 digits

	multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs	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 (appears also in Mental Methods)	a one-digit number using formal written layout	two-digit number using a formal written method, including long multiplication for two-digit numbers	by a two-digit whole number using the formal written method of long multiplication
		No written methods suggested for division at this point so continue to teach following normal progression.	No written methods suggested for division at this point so continue to teach following normal progression.	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	divide numbers up to 4-digits by a two-digit whole number using the formal written method of short division where appropriate for 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 use written division methods in cases where the answer has up to two decimal places (copied from Fractions (including decimals))
Properties of number: Multiples, Factors, Primes, Square and Cube Numbers					
		Recognise multiples of the 2, 3, 4 , 5, 8 and 10 multiplication tables	recognise and use factor pairs and commutativity in	identify multiples and factors, including finding all factor pairs	identify common factors, common multiples and prime numbers

			mental calculations (repeated)	of a number, and common factors 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 recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) Higher ability. Consolidate in year 6.	use common factors to simplify fractions; use common multiples to express fractions in the same denomination (copied from Fractions) calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3 (Measures)
Order of Operations					
				use their knowledge of the order of operations to carry out calculations involving the four operations (introduce).	use their knowledge of the order of operations to carry out calculations involving the four operations
Inverse, checking and estimation					
		estimate the answer to a calculation and use inverse operations to check answers	estimate and use inverse operations to check answers to a calculation	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, levels of accuracy

Fractions (including decimals and percentages)

Counting in fractional steps					
	Pupils should count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line (Non Statutory Guidance)	count up and down in tenths	count up and down in hundredths		
Recognising fractions					
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	recognise, find, name and write fractions $^{1}/_{3}$, $^{1}/_{4}$, $^{2}/_{4}$ and $^{3}/_{4}$ of a length, shape, set of objects or quantity	recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators recognise that tenths arise from dividing an object into 10 equal parts and in dividing one – digit numbers or quantities by 10. recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators	recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten	recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents (appears also in Equivalence)	
Comparing fractions					

		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
Comparing decimals					
		Connect tenths to place value and decimals measures not restricted to decimals between 0 and 1 (non-statutory)	compare numbers with the same number of decimal places up to two decimal places (tops – consolidate and introduce to all in year 5).	read, write, order and compare numbers with up to three decimal places identify the value of each digit in numbers given to three decimal places (begin in year 5 if possible)	identify the value of each digit in numbers given to three decimal places
Rounding including decimals					
			round decimals with one decimal place to the nearest whole number	round decimals with two decimal places to the nearest whole number and to one decimal place	solve problems which require answers to be rounded to specified degrees of accuracy
Equivalence including fractions, decimals and percentages					
	write simple fractions e.g., $^1/_2$ of 6 = 3 and recognise the equivalence of $^2/_4$ and $^1/_2$.	recognise and show, using diagrams, equivalent fractions with small denominators	recognise and show, using diagrams, families of common equivalent fractions recognise and write decimal equivalents of any number of tenths or hundredths	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths read and write decimal numbers as fractions (e.g. 0.71 = $^{71}/_{100}$) recognise and use thousandths and relate	use common factors to simplify fractions; use common multiples to express fractions in the same denomination associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)

				them to tenths, hundredths and decimal equivalents	
			recognise and write decimal equivalents to $^{1}/_{4}$; $^{1}/_{2}$; $^{3}/_{4}$	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 as a decimal fraction	recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
Addition and subtraction of fractions					
		add and subtract fractions with the same denominator within one whole (e.g. $^{5}/_{7} + ^{1}/_{7} = ^{6}/_{7}$)	add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and multiples of the same number recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^{2}/_{5} + ^{4}/_{5} = ^{6}/_{5} = 1^{1}/_{5}$)	add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
Multiplication and division of 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 (e.g. $^{1}/_{4} \times ^{1}/_{2} = ^{1}/_{8}$)

				(will need to be covered again in Year 6).	multiply one-digit numbers with up to two decimal places by whole numbers divide proper fractions by whole numbers (e.g. $^{1}/_{3} \div 2 = {}^{1}/_{6}$)
Multiplication and division of decimals					
					multiply one-digit numbers with up to two decimal places by whole numbers
			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	multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places (begin in Year 5 if possible)	multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
				identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places (begin in year 5 if possible)	identify the value of each digit to three decimal places and multiply and divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
					associate a fraction with division and calculate

					decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $^3/_8$)
					use written division methods in cases where the answer has up to two decimal places
Problem solving					
		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 problems involving numbers up to three decimal places	
			solve simple measure and money problems involving fractions and decimals to two decimal places.	solve problems which require knowing percentage and decimal equivalents of $^1/_2$, $^1/_4$, $^1/_5$, $^2/_5$, $^4/_5$ and those with a denominator of a multiple of 10 or 25. Begin to introduce finding % of amounts	Solve problems involving the calculation of percentages of whole numbers or measures such as 15% of 360 and the use of percentage for comparison.

Measurement

Comparing and estimating					
compare, describe and solve practical problems for:	compare and order lengths, mass, volume/capacity and	compare and order lengths, mass, volume/capacity and	estimate, compare and calculate different measures, including	calculate and compare the area of squares and rectangles including using	calculate, estimate and compare volume of cubes and cuboids using

* lengths and heights [e.g. long/short, longer/shorter, tall/short, double/half] * mass/weight [e.g. heavy/light, heavier than, lighter than] * capacity and volume [e.g. full/empty, more than, less than, half, half full, quarter] time [e.g. quicker, slower, earlier, later]	record the results using >, < and =	record the results using >, < and = (consolidation from Year 2)	money in pounds and pence (also included in Measuring)	standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes (also included in measuring) estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)	standard units, including centimetre cubed (cm^3) and cubic metres (m^3), and extending to other units such as mm^3 and km^3.
sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	compare and sequence intervals of time	compare durations of events, for example to calculate the time taken by particular events or tasks			
Measuring and calculating					
measure and begin to record the following: * **lengths and heights** * **mass/weight** * **capacity and volume** * **time** (hours, minutes, seconds**)**	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	measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml)	estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing) measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml) **(consolidation from year 3 and introducing volume)**	use all four operations to solve problems involving measure (e.g., **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 (appears also in Converting)

		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
recognise and know the value of different denominations of **coins and notes**	recognise and use symbols for pounds **(£) and pence (p)**; combine amounts to make a particular value 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	add and subtract amounts of **money** to give change, using both £ and p in practical contexts	add and subtract amounts of **money** to give change, using both £ and p in practical contexts (consolidation from Year 3)		
			find the area of rectilinear shapes by counting squares	calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes recognise and use square numbers and cube numbers, and the notation for squared (^{2})	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 [e.g., mm^3 and km^3]. recognise when it is possible to use

				and cubed (^{3}) Higher ability (copied from Multiplication and Division)	formulae for area and volume of shapes
Telling the time					
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.	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 (consolidate from year 2) Calculate time intervals and find start or end times for a given time interval.	Read time to the nearest minute; use am and pm and 24 hour clock notation; choose units of time to measure time intervals and calculate time intervals Begin to work on timetables	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) Read timetables Use a calendar	Tell the time using Roman Numerals (by this point, children should have learnt Roman Numerals)
recognise and use language relating to dates, including days of the week, weeks, months and years	know the number of minutes in an hour and the number of hours in a day. (appears also in Converting)	estimate and read time with increasing accuracy to the nearest 5 minutes; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Comparing and Estimating)			

		Convert between hours and minutes	solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Converting)	solve problems involving converting between units of time	solve problems involving converting between units of time (consolidation)
Converting					
		Begin to convert between different units of measure	convert between different units of measure (e.g. kilometre to metre; hour to minute)	convert between different units of metric measure (e.g. 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
	know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time)	know the number of seconds in a minute and the number of days in each month, year and leap year Convert between hours and minutes	solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) solve problems involving converting between units of time	solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate (appears also in Measuring and Calculating)
				understand and use equivalences between metric units and common imperial units	convert between miles and kilometres understand and use equivalences between metric units and

				such as inches, pounds and pints	common imperial units such as inches, pounds and pints (consolidation from year 5)

Geometry – properties of shapes

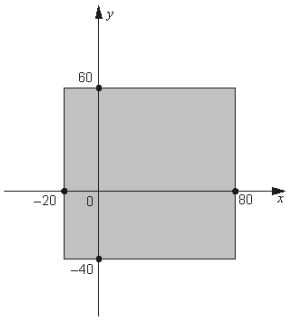
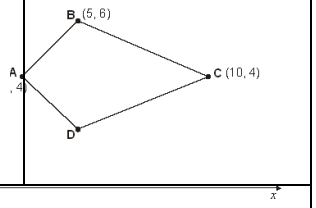
Identifying some shapes and their properties					
recognise and name common 2-D and 3-D shapes, including: * 2-D shapes [e.g. rectangles (including squares), circles and triangles] * 3-D shapes [e.g. cuboids (including cubes), pyramids and spheres].	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]	identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] (consolidation from year 2) identify lines of symmetry in 2-D shapes presented in	identify lines of symmetry in 2-D shapes presented in different orientations	identify 3-D shapes, including cubes and other cuboids, from 2-D representations	recognise, describe and build simple 3-D shapes, including making nets (appears also in Drawing and Constructing) illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius

		different orientations – begin in year 3			
Drawing and constructing					
		draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	complete a simple symmetric figure with respect to a specific line of symmetry	draw given angles, and measure them in degrees (^{o}) draw 2-D shapes using given dimensions and angles – this could be covered in year 5 in order to give Year 6 more time for circle work	draw 2-D shapes using given dimensions and angles recognise, describe and build simple 3-D shapes, including making nets (appears also in Identifying Shapes and Their Properties)
Comparing and classifying					
	compare and sort common 2-D and 3-D shapes and everyday objects	compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes Begin in year 3	compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes	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	compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
Angles					
		recognise angles as a property of shape or a description of a turn		know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles	
		identify right angles, recognise that two right angles make a half-turn, three make three quarters	identify acute and obtuse angles and compare and order angles up to two right angles by size	identify: * angles at a point and one whole turn (total 360^{o})	recognise angles where they meet at a point, are on a straight line, or are

		of a turn and four a complete turn; identify whether angles are greater than or less than a right angle		* angles at a point on a straight line and ½ a turn (total 180°) * other multiples of 90°	vertically opposite, and find missing angles
		identify horizontal and vertical lines	Identify pairs of perpendicular and parallel lines	Identify pairs of perpendicular and parallel lines (consolidate)	Identify pairs of perpendicular and parallel lines (consolidate)

Geometry – Position and direction

Position, direction and movement					
describe position, direction and movement, including half, quarter and three-quarter turns.	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)	Introduce co-ordinates 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) (consolidation from year 2)	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 (simple explanations e.g. 2 squares left etc)	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 (translation e.g., +2 in the x axis)	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.
			plot specified points and draw sides to complete a given polygon Simple questions e.g. three points given of a square. What is the missing co-ordinate?	plot specified points and draw sides to complete a given polygon	plot specified points and draw sides to complete a given polygon (if required for consolidation) More complex problems e.g.

				More complex problems e.g.    	
Patterns					
	order and arrange combinations of mathematical objects in patterns and sequences				

Statistics

Interpreting, constructing and presenting data					
	interpret and construct simple pictograms, tally charts, block diagrams and simple tables	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 (interpreting line graphs only – drawing can be left to Year 5)	complete, read and interpret information in tables, including timetables interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	interpret and construct pie charts and line graphs and use these to solve problems
	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				
Solving problems					
		solve one-step and two-step questions [e.g., 'How many more?' and 'How many 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 and difference problems using information presented in a line graph	calculate and interpret the mean as an average

Ratio and proportion

					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

					grouping using knowledge of fractions and multiples.

Algebra

Equations					
solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and **missing number problems** such as 7 = □ - 9 (copied from Addition and Subtraction)	recognise and use the inverse relationship between addition and subtraction and use this to check calculations and **missing number** problems. (copied from Addition and Subtraction)	solve problems, including **missing number** problems, using number facts, place value, and more complex addition and subtraction. (copied from Addition and Subtraction) solve problems, including **missing number** problems, involving multiplication and division, including integer scaling (copied from Multiplication and Division)		use the properties of rectangles to deduce related facts and find **missing lengths and angles** (copied from Geometry: Properties of Shapes)	express missing number problems algebraically
	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction)	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction) Mental maths targets	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction) Mental maths targets	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction) Mental maths targets	recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction) Mental maths targets find pairs of numbers that satisfy number sentences involving two unknowns
represent and use number bonds and related subtraction facts within 20 (copied from Addition and Subtraction)					enumerate all possibilities of combinations of two variables

Formulae					
			Perimeter can be expressed algebraically as 2(a + b) where a and b are the dimensions in the same unit. (Copied from NSG measurement)		use simple formulae recognise when it is possible to use **formulae** for area and volume of shapes (copied from Measurement)
Sequences					
sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening (copied from Measurement)	compare and sequence intervals of time (copied from Measurement) order and arrange combinations of mathematical objects in patterns (copied from Geometry: position and direction)				generate and describe linear number sequences

***any pupils working at pre-KS1 objectives will have a bespoke programme developed to suit their specific needs**