Neatishead Salhouse and Fleggburgh VC Primary Schools

Mathematics

'Pure mathematics is, in its way, the poetry of logical ideas'   Einstein

Curriculum Intent

We aim for our pupils to become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.
They will be taught to reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language. They will be able to solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions. They will be given opportunities to apply their mathematics skills, knowledge and understanding across the curriculum. There is a clear plan for progression. Children will be supported to close any gaps in their learning. Where children show high ability, talent and interest, they will be challenged. Every effort will be made to identify and lift barriers to learning. Maths will be presented as a subject to enjoy.

Curriculum Implementation

Our mathematics curriculum covers everything from cooking with weights and measures all the way through to long division and algebra. New mathematical ideas are introduced with hands-on activities. Children self-assess, are constantly challenged and have clear models and images to help their understanding. Problem solving investigations develop children's conceptual understanding enabling them to apply their skills to different problems. We practice mental arithmetic daily and explicitly teach strategies for calculation with a focus on mental methods, jottings and formal written meth The school uses Apps to support the development of mathematical thinking which can be accessed at home and school. Opportunities are creatively planned for cross curricular activities which encourage the application of maths.

Curriculum Impact

Our children will enjoy, feel successful in and challenged by mathematics. They will recognise that are becoming quicker to recall facts and procedures. They will recognise they are moving more flexibly and fluently between different contexts and representations of mathematics. They will be excited by their growing ability to recognise relationships and make connections in mathematics and to other subject areas. They will think of themselves as mathematicians and have the resilience to learn from mistakes and persevere to find methods which work well for them. They will be able to explain strategies they use.

Formative and summative assessments will inform planning. Progress towards NC expectations will be carefully tracked.

Progression in Mathematics

Reception	Year 1	Year 2
Counting		
Count reliably with numbers to 20 and place them in order. Count an irregular amount of objects. Can say which number is one more or one less than a given number	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens given a number, identify one more and one less	count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward
Comparing numbers		
Use the language 'more' and 'fewer' to compare two sets of objects.	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
Identifying, representing and estimating		

numbers		
Select the correct numeral to represent numbers to 20. Estimate how many objects they can see and checks by counting.	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
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
Understanding Place Value		
		recognise the place value of each digit in a two- digit number (tens, ones)
Problem Solving		
Begin to identify own mathematical problems based on own interests and fascinations.		use place value and number facts to solve problems

Greater depth	Greater depth	Greater depth
Estimate a number of objects and check quantities by counting up to 20. Solve practical problems that involve combining groups of 2, 5 or 10.	Count reliably well beyond 100. Count on and back in 3's from any given number to beyond 100. Say the number that is ten more or ten less than a number to 100. Know the signs < and >.	Reason with numbers showing an understanding of place value.

Year 3	Year 4	Year 5	Year 6
Counting			
count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number	count backwards through zero to include negative numbers count in multiples of 6, 7, 9, 25 and 1 000 find 1000 more or less than a given number	interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero count forwards or backwards in steps of powers of 10 for any given number up to 1000 000	use negative numbers in context, and calculate intervals across zero
Comparing numbers			
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	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, 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 up to 1000 in numerals and in words	read Roman numerals to 100 (I to C) and know that over time, the	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	read, write, order and compare numbers up to

tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks (copied from Measurement)	numeral system changed to include the concept of zero and place value.	(appears also in Comparing Numbers) read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	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 three-digit number (hundreds, tens, ones)	recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) 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 1 000 where the answers are up to three decimal places (copied from Fractions)
Rounding			
	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	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)

		(copied from Fractions)	

Problem Solving			
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

Greater Depth			
Recognise the value of each digit in a four-digit number and the value of a tenth. Begin to have an understanding about negative numbers, recognising they are smaller than 0.	Round any number to 100, 000 to the nearest 10, 100, 1000 or 10, 000. Use tenths, hundredths and thousands when comparing values.	Have a concept of numbers well beyond 1, 000, 000 and their relative association to distances to planets, historical data and geographical aspects. Use rounding as a strategy for quickly assessing what approximate answers ought to be, before calculating. Link working across 0 for positive and negative numbers to work time between BC and AD in history.	Use the symbols =, ≠, ≤, ≥ correctly.

Number: Addition and Subtraction

Reception	Year 1	Year 2
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
Mental Calculation		
Finds the total number of items in two groups by counting all of them. In practical activities and discussion, begin to use the vocabulary involved in adding and subtracting. Add and subtract two single digit numbers. Count on or back to find the answer to addition and subtraction questions.	add and subtract one-digit and two-digit numbers to 20, including zero read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods)	*add and subtract numbers using concrete objects, pictorial representations, and mentally, including: * a two-digit number and ones * a two-digit number and tens * two two-digit numbers adding three one-digit numbers show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
Written Methods		
	read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation)	
Inverse operations, estimating and checking answers		

		recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

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)
Greater depth		
Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups.	Apply knowledge of number to solve a one-step problem involving addition and subtraction. Add and subtract one digit and two digit numbers to 50, including 0.	Use reasoning about numbers and relationships to solve more complex problems and explain their thinking. Solve unfamiliar word problems that involve more than one step.

Number: Addition and Subtraction

Year 3	Year 4	Year 5	Year 6
Mental Calculation			
add and subtract numbers mentally, including: * a three-digit number and ones * a three-digit number and tens * a three-digit number and hundreds		add and subtract numbers mentally with increasingly large numbers	perform mental calculations, including with mixed operations and large numbers use their knowledge of the order of operations to carry out calculations involving the four operations
Written Methods			

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)	
Inverse operations, estimating and checking answers			
estimate the answer to a calculation and use inverse operations to check answers	estimate and use inverse operations to check answers to a calculation	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy	use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
Problem Solving			
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
Greater depth			

Add and subtract numbers with any number of digits using formal written methods.	Use tenths, hundreds and thousandths when solving addition and subtraction problems. Solve multi-step problems involving more than one of the operations.	Calculate number problems algebraically for example 2x-3=5.	

Number: Multiplication and Division

Reception	Year 1	Year 2
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) recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
Mental Calculation		
		show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
Written Calculation		
		calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
Problem Solving		

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 problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Greater depth		
Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups.	Apply knowledge of number to solve a one step problem involving simple multiplication and division.	Recall and use multiplication and division facts for 2, 5 and 10, and make deductions outside known multiplication facts. Solve unfamiliar word problems that involve more than one step.

Year 3	**Year 4**	**Year 5**	**Year 6**
Multiplication and division facts			
count from 0 in multiples of 4, 8, 50 and 100 (copied from Number and Place Value) recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	*count in multiples of 6, 7, 9, 25 and 1 000* (copied from Number and Place Value) recall multiplication and division facts for multiplication tables up to 12 × 12	*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)	
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 recognise and use factor pairs and commutativity in mental calculations (appears also in Properties of Numbers)	multiply and divide numbers mentally drawing upon known facts multiply and divide whole numbers and those involving decimals by 10, 100 and 1000	perform mental calculations, including with mixed operations and large numbers *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 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 Mental Methods)	multiply two-digit and three-digit numbers by a one-digit number using formal written layout	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 divide numbers up to 4 digits by a one-digit number using the formal written method of	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 short division where appropriate

		short division and interpret remainders appropriately for the context	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 numbers: Multiples, factors, primes, square and cube numbers			

	recognise and use factor pairs and commutativity in mental calculations (repeated)	identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers 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})	identify common factors, common multiples and prime numbers *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* (copied from Measures)
Order of operations			
			use their knowledge of the order of operations to carry out calculations involving the four operations
Inverse operations, estimating and checking answers			
estimate the answer to a calculation and use inverse operations to check answers (copied from Addition and Subtraction)	*estimate and use inverse operations to check answers to a calculation* (copied from Addition and Subtraction)		use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy

Problem Solving			
solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects	solve 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 multiplication and division including using their knowledge of factors and multiples, squares and cubes solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	solve problems involving addition, subtraction, multiplication and division *solve problems involving similar shapes where the scale factor is known or can be found* (copied from Ratio and Proportion)

Know all multiplication facts up to 12x12 and be able to instantaneously answer questions such as how many 7's in 42. Multiply and divide any two digit number by a single digit number and have an understanding of remainder.	Solve multi-step problems involving more than one of the operations. Rapidly recall answer when multiplying and diving a whole or decimal number by 10.	Divide whole numbers (up to 4 digits) by 2 digit numbers using preferred method. Recognise the symbol for square root and work out square roots for numbers up to 100.	Multiply all integers (using efficient written methods) including mixed numbers and negative numbers. Move beyond squared and cubed numbers to calculate problems such as X x 10n where n is positive.

Number: Fractions (including decimals and percentages)

Reception	Year 1	Year 2
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)*
Recognising fractions		
Solve problems that involving halving.	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 , 2/4 , 1/4 and 3/4 of a length, shape, set of objects or quantity
Equivalence (including fractions, decimals and percentages)		

		write simple fractions e.g. $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.
Greater depth		
		Find and compare fractions of amounts.

Number: Fractions (including decimals and percentages)

Year 3	Year 4	Year 5	Year 6
Counting in fractional steps			
count up and down in tenths	count up and down in hundredths		
Recognising fractions			

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			
	compare numbers with the same number of decimal places up to two decimal places	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
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)			
recognise and show, using diagrams, equivalent fractions with small denominators	recognise and show, using diagrams, families of common equivalent fractions	identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths	use common factors to simplify fractions; use common multiples to express fractions in the same denomination

	recognise and write decimal equivalents of any number of tenths or hundredths recognise and write decimal equivalents to $\frac{1}{4}, \frac{1}{2}, \frac{3}{4}$	read and write decimal numbers as fractions (e.g. $0.71 = \frac{71}{100}$) 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 as a decimal fraction	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. $\frac{3}{8}$) 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. $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$)	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. $\frac{2}{5} + \frac{4}{5} = \frac{6}{5}$)	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. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$)
			multiply one-digit numbers with up to two decimal places by whole numbers
			divide proper fractions by whole numbers (e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$)
Multiplication and division of decimals			
	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 one-digit numbers with up to two decimal places by whole numbers
			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
			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 simple measure and money problems involving fractions and decimals to two decimal places.	solve problems involving numbers up to three decimal places solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those with a denominator of a multiple of 10 or 25.	
Greater depth			
Can find fractional values (from ½ to 1/10) of amounts up to 1000.	Relate tenths and hundredths to fractional values. Work out simple percentage values of whole numbers. Compare and add fractions whose denominators are all multiples of the same number.		Compare, order and convert between fractions, decimals and percentages in contexts.

Ratio and Proportion

Year 3	Year 4	Year 5	Year 6
			solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison solve problems involving similar shapes where the scale factor is known or can be found solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.
Greater depth			
			Reason with numbers showing an understanding of ratio and proportion.

Measurement

Reception	Year 1	Year 2
Comparing / estimating		
Orders two or three items by length or height. Orders two items by weight or capacity. Everyday language to talk about: *size [e.g. long/short, longer/shorter, tall/short] * weight [e.g. heavy/light, heavier than, lighter than] *capacity [e.g. full/empty, more than, less than, half, half full, quarter] * position [e. g. behind, next to] *distance *time [e.g. quicker, slower, earlier, later] *money Orders and sequences familiar events.	compare, describe and solve practical problems for: * 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] sequence events in chronological order using language [e.g. before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]	compare and order lengths, mass, volume/capacity and record the results using >, < and = compare and sequence intervals of time
Measuring and calculating		

Measures short periods of time in simple ways. Everyday language to talk about: *money	measure and begin to record the following: * **lengths and heights** * **mass/weight** * **capacity and volume** * **time** (hours, minutes, seconds**)** recognise and know the value of different denominations of **coins and notes**	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 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
Telling the time		
Everyday language to talk about: *time [e.g. quicker, slower, earlier, later]	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.

	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)

Converting		
		know the number of minutes in an hour and the number of hours in a day. (appears also in Telling the Time)
Greater depth		
Estimate, measure, weigh and compare and order objects. Talk about properties, position and time.	Recognise all coins and notes, and know their value. Use coins to pay for items bought up to £1. Use knowledge of time to know when key periods of the day happen, for example, lunchtime, home time etc.	Read scales where not all numbers on the scale are given, and estimate points in between. Read the time on a clock to the nearest 5 minutes.

Measurement

Year 3	Year 4	Year 5	Year 6
Comparing and estimating			
compare durations of events, for example to calculate the time taken by particular events or tasks estimate and read time with increasing accuracy to the nearest minute; 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 Telling the Time)	estimate, compare and calculate different measures, including money in pounds and pence (also included in Measuring)	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 (also included in measuring) estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water)	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.
Measuring and calculating			
measure, compare, add and subtract: **lengths** (m/cm/mm); **mass** (kg/g); **volume/capacity** (l/ml) measure the **perimeter** of simple 2-D shapes	estimate, compare and calculate **different measures,** including **money in pounds and pence** (appears also in Comparing) measure and calculate the **perimeter** of a rectilinear figure (including squares) in centimetres and metres	use all four operations to solve problems involving measure (e.g. **length, mass, volume, money**) using decimal notation including scaling. measure and calculate the **perimeter** of composite rectilinear shapes in centimetres and metres	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) recognise that shapes with the same areas can have different **perimeters** and vice versa

add and subtract amounts of **money** to give change, using both £ and p in practical contexts	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})* *and cubed (^{3})* (copied from Multiplication and Division)	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 formulae for area and volume of shapes
Telling the 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, hours and o'clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight (appears also in Comparing and Estimating)	read, write and convert time between analogue and digital 12 and 24-hour clocks (appears also in Converting) 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	
Converting			

know the number of seconds in a minute and the number of days in each month, year and leap year	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

	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)
	solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days (appears also in Telling the Time)	understand and use equivalences between metric units and common imperial units such as inches, pounds and pints	convert between miles and kilometres
Greater depth			
Use knowledge of number to solve problems related to money, time and measures. Can relate knowledge of time to problems related to timetables. Measure, compare, add and subtract more complex problems using common metric measures set out in kg, g, kl, l, m, km.	Use a 24 hour timetable to find out times for a journey between various places. Use knowledge of perimeter to work out the perimeter of large areas around school using metres and centimetres.	Use knowledge of measurement to create plans of areas around school, such as classroom, filed, play area etc. Relate imperial measures still used regularly in our society to their metric equivalent, e.g. miles to kilometres, pounds to kilograms. Use a range of timetables to	Use formula for measuring the area of shape such as cuboid and triangle to work out the area of an irregular shape in the school environment. Use four operations with mass, length, time, money and other measures, including with decimal quantities. Calculate costs and time

		work out journey times on a fictional journey around the world, e.g. how long would it take to reach the rainforests in the Amazon.	involved to visit a destination in another part of the world.

Reception	Year 1	Year 2
Identifying shapes and their properties		
Uses familiar objects and common shapes to create and recreate patterns and build models. Selects a particular named shape. Explore characteristics of everyday objects and shapes, and use mathematical language to describe them. Beginning to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes.	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]
Comparing and classifying		
		compare and sort common 2-D and 3-D shapes and everyday objects

Greater depth		
Recognise and name a range of 2D and 3D shapes.	Recognise different 2D and 3D shapes in the environment.	Describe similarities and differences of 2D and 3D shapes using their properties.

Year 3	Year 4	Year 5	Year 6
Identifying shapes and their properties			
	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
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 recognise, describe and build simple 3-D shapes, including making nets
Comparing and classifying			

	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 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	identify acute and obtuse angles and compare and order angles up to two right angles by size	know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles Identify angles at a point and one whole turn (total 360°) Identify angles at a point on a straight line and ½ a turn (total 180°) Identify other multiples of 90°	recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

Greater depth			
	Know that the total internal angles of a triangle measure 180° and can measure each.	Recognise nets and show an understanding that they create 3D shapes. Solve problems involving angles.	

Reception	Year 1	Year 2
Position, direction and movement		

Everyday language to talk about: * position [e. g. behind, next to]	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)
Pattern		
Recognise, create and describe patterns.		order and arrange combinations of mathematical objects in patterns and sequences
Greater depth		
	Give instructions using positional and directional language.	

Year 3	Year 4	Year 5	Year 6
Position, direction and movement			
recognise angles as a property of shape or a description of a turn	describe positions on a 2-D grid as coordinates in the first quadrant	identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	describe positions on the full coordinate grid (all four quadrants)
recognise angles as a property of shape or a description of a turn	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		draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Reception	Year 1	Year 2
Handling data		
		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

Year 3	Year 4	Year 5	Year 6
Counting			
interpret and present data using bar charts, pictograms and tables	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables	interpret and construct pie charts and line graphs and use these to solve problems
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
Greater depth			

	Collect own data on a given project and present information in graphical formats of their choosing.	Collect own data on a given project and present information in graphical formats of their choosing, charts, graphs and tables.	Collect own data on a personal project and present information in formats of their choosing, charts, graphs and tables, and answer specific questions related to their research.

Algebra

Reception	Year 1	Year 2
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) represent and use number bonds and related subtraction facts within 20 (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) recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 (copied from Addition and Subtraction)

Algebra

Year 3	Year 4	Year 5	Year 6
Equations			
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 find pairs of numbers that satisfy number sentences involving two unknowns 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			

			generate and describe linear number sequences

Greater depth			
		Calculate number problems algebraically for example 2x-3=5.	Recognise an arithmetic progression and find the nth term. Move beyond squared and cubed numbers to calculate problems such as X x 10n where n is positive.

Vocabulary					
	Number	**Fractions Decimals %**	**Measurement Space Shape**	**Data**	**Algebra**
Reception	Zero, number, one, two, three….to twenty and beyond, count, count on, count back, is the same as, more, less, pattern, digit, the same number as, more, larger, bigger,	Parts of a whole, half, quarter.	Measure, size, compare, guess, estimate, enough, too much, too little, too many, too few, nearly, close to, about the same as.		

	greater, fewer, smaller, less, fewest, smallest, least, most, biggest, largest, greatest, one more, one less, compare, order, size, first, second, third…twentieth, last, before, after, next, between. Guess, estimate, nearly, close,about the same as, just over, just under, too many, too few, enough, not enough. Add, more, and, make, sum, total, altogether, double, one more… take away, one less, difference between. Sharing, doubling, halving, number patterns.		Length, height, long, short, tall, wide, narrow, thick, thin, longer, shorter, taller… longest, shortest, tallest, highest… Weigh, weighs, balances, heavy, light, heavier than, lighter then, scales, non-standard units. Full empty, half full, holds, container. Time, days of the week, Monday, Tuesday….day, week, birthday, morning, afternoon, evening, night, bedtime, dinner time, playtime, today, yesterday, tomorrow, before, after, next, last, quick, quicker, quickest, quickly, slow, slower, slowest, slowly, old, new, hour, o'clock, watch, clock, hands. Money, coin, penny, pence, pound, price, cost, buy, sell, spend,		

			spent, pay. Shape, pattern, flat, curved, straight, round, solid, sort, make, build, draw, size, bigger, larger, smaller, symmetrical, pattern, repeating pattern, match, 2D shape, corner, side, rectangle, square, circle, triangle, 3D shape, face, edge, corner, cube, pyramid, sphere, cone. Position, over, under, above, below, top, bottom, on, in, outside, inside, around, in front of, behind, front, back, beside, next to, between, pattern, repeated pattern.		
Year 1	Numeral, twenty one, twenty two…one hundred, forwards, backwards, equal to, equivalent to, most, least, many, multiple of, half way between, above, below, roughly.	Fraction, equal part, equal grouping, equal sharing, one of two equal parts, one of four equal parts.	Measurement, roughly, centimetre, metre, standard units, wide, narrow, ruler, metre stick, kilogram, litre, capacity, volume, more than, less than,		Number bonds, facts, addition, subtraction, missing number problems.

	Addition, near double, half, halve, subtract, equals, is the same as, number bonds/ pairs, missing number. Multiplication, multiply, multiplied by, multiple, division, dividing, grouping, array.		quarter full. Months of the year, January, February…, seasons, Autumn, Winter, Spring, Summer, weekend, month, year, earlier, later, first, midnight, date, always, never, often, sometimes, usually, once, twice, half past, clock face, hour hand, minute hand, hours, minutes. Point, pointed, cuboid, cylinder. Underneath, centre, left, right, whole turn, half turn, quarter turn, three quarter turn.		
Year 2	Two hundred….one thousand, threes, fours, tally, sequence, continue, predict, rule, >greater than, <less than, hundreds, one digit, two digit, three digit number, place, place value, stands for, represents, exchange, twenty first, twenty second…exact, exactly. Ten more, ten less, facts. Groups of, times, once,	Equivalent fraction, numerator, denominator, two halves, two quarters, three quarters, one third, two thirds, one of three equal parts.	Measurement, roughly, centimetre, metre, standard units, wide, narrow, ruler, metre stick, kilogram, litre, capacity, volume, more than, less than, quarter full. Months of the year, January, February…, seasons, Autumn, Winter, Spring, Summer, weekend, month, year, earlier, later, first,	Count, tally, sort, vote, graph, block graph, pictogram, represent, group, set, list, table, label, title, most/least popular, most/least common.	Inverse, check, fluently.

	twice, three times…ten times, repeated addition, divide, divided by, divided into, share, share equally, left over, one each, two each…group in pairs, threes…equal groups of, row, column, multiplication table, fact.		midnight, date, always, never, often, sometimes, usually, once, twice, half past, clock face, hour hand, minute hand, hours, minutes. Surface, line symmetry, rectangular, circular, triangular, pentagon, hexagon, octagon. Route, higher, lower, clockwise, anticlockwise, right angle, straight line.		
Year 3	Count in fours, eighths, fifties….hundreds, factor of, relationship, roman numerals, one hundred more, one hundred less, approximate, approximately, round, nearest, round to the nearest ten/ hundred, round up, round down. Tens boundary, hundreds boundary, complex, operations. Factor, product, remainder.	Sixths, sevenths, eighths, tenths.	Division, approximately, millimetre, kilometre, mile, distance apart, between, to, from, perimeter, centigrade, century, calendar, earliest, latest, a.m, p.m, roman numerals, 12 hour clock time, 24 hour clock time. Draw, perimeter, pentagonal, hexagonal, octagonal, quadrilateral, right angled, parallel, perpendicular, hemisphere, prism, triangular prism,	Chart, bar chart, frequency table, Carroll diagram, Venn diagram, axis, axes, diagram.	Missing number, complex, integer scaling, facts, complex.

			orientations. Compass point, north, south, east, west, N, S, E, W, horizontal, vertical, diagonal, angle, greater/smaller angle than…, acute angle, obtuse angle.		
Year 4	Ten thousand, hundred thousand, million, count in sixes, sevens, nines, twenty five, next, consecutive, integer, positive, negative, above/below zero, minus, negative numbers, one thousand more, one thousand less, thousand. Inverse Inverse, square, squared, cube, cubed.	Hundredths, decimal, decimal fractions, decimal point, decimal place, decimal equivalent, proportion.	Unit, standard unit, metric unit, breadth, edge, area, covers, square centimetre, mass, measuring cylinder, leap year, millennium, date of birth, timetable, arrive, depart. Line, construct, sketch, centre, angle, right angles, base, square based, reflect, reflection, regular, irregular, two dimensional, oblong, rectilinear, equilateral triangle, isosceles triangle, scalene triangle, heptagon, parallelogram, rhombus, trapezium, polygon, three dimensional, spherical, cylindrical,	Survey, questionnaire, data	Dimensions, perimeter, algebraic.

			tetrahedron, polyhedron. North east, north west, south east, south west, NE, NW, SE, SW, translate, translation, rotate, rotation, degree, reflection, ruler, set square, angle measurer, compass.		
Year 5	Factor pair, greater than or equal to, less than or equal to, formula, divisibility, square number, prime number, ascending/ descending order, ten thousand. Units boundary, tenths boundary.	Proper/improper fraction, equivalent, reduced to, cancel, thousandths, in every, for every, percentage, per cent.	Imperial unit, square metre, square millimetre, pi Radius, diameter, congruent, axis of symmetry, reflective symmetry, x-axis, y-axis, quadrant, octahedron. pint, gallon, discount, currency. Coordinate, protractor.	Database, bar line chart, line graph, maximum/minimum value, outcome.	Missing lengths, missing angles.
Year 6	Factorise, prime factor, digit total.	Integer, percentages, scale factor, unequal grouping.	Imperial unit, square metre, square millimetre, pint, gallon, discount, currency. Circumference, concentric, arc, net, open, closed, intersecting, intersection, plane, kite, dodecahedron. Reflex angle.	Pie chart, mean, mode, median, range, estimates, statistics, distribution.	Formulae, equation, unknown, variable.