Buxton Primary School

Calculation Policy 2023

Formally adopted by the Governing Board of:-	**Buxton Primary School**
On:-	**14th September 2023**
Chair of Governors:-	**Kathryn Corder**
Last updated:-	**September 2019**
Review Date:	**September 2026**

Introduction

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out under the following headings: addition, subtraction, multiplication and division.
Children will use mental methods as their first port of call when appropriate, but for calculations that they cannot do in their heads, they will need to use an efficient written method accurately and with confidence.

<u>When faced with a calculation problem, encourage children to ask:</u>

* Can I do this in my head?
* Can I do this using drawings or jottings?
* Do I need to use a written method?
* Should I use a calculator?

<u>Also the children are encouraged to estimate and then check the answer -</u>

Encourage them to ask:

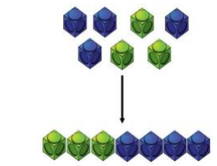
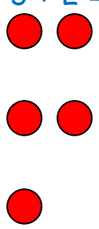
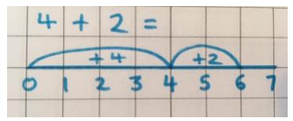
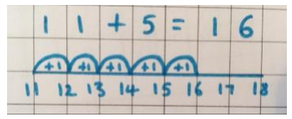
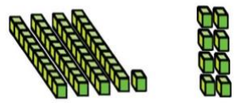
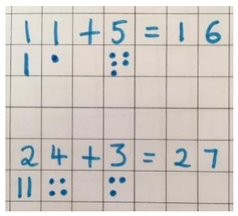
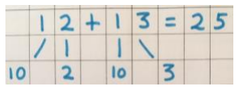
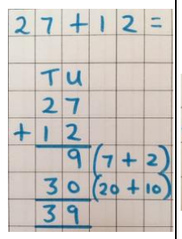
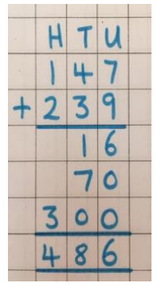
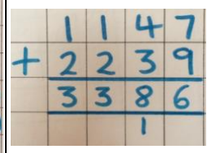
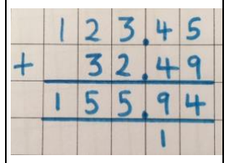
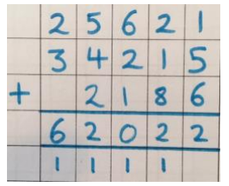
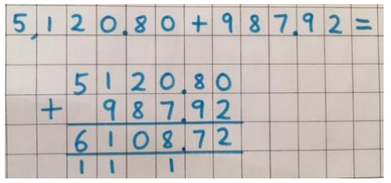
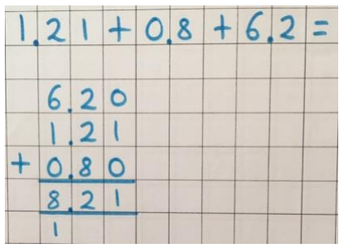
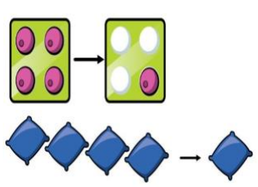
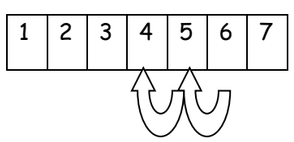
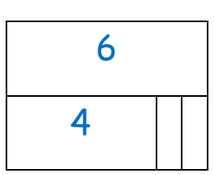
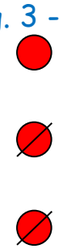
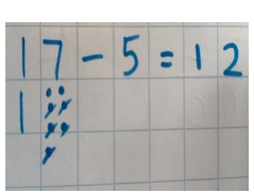
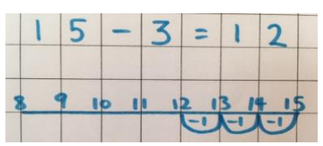
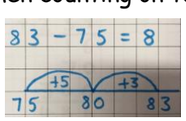
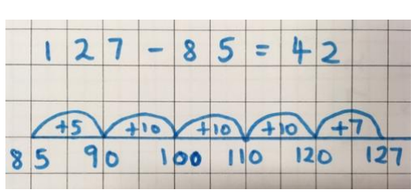
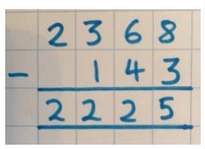
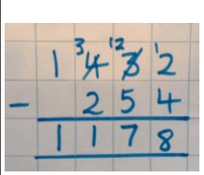
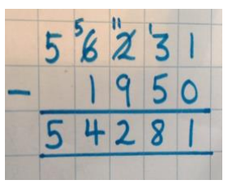
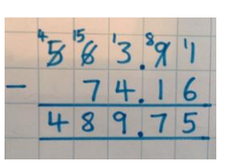
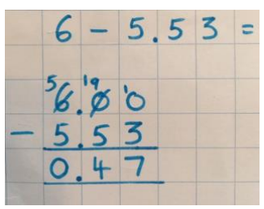
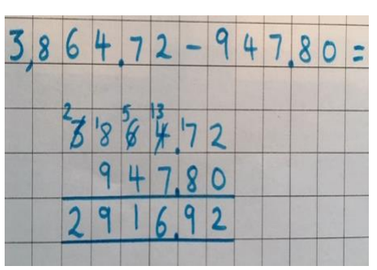
Is the answer sensible?

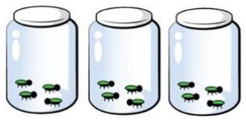
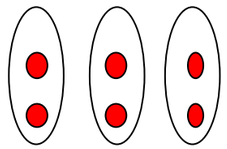
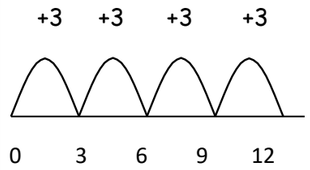
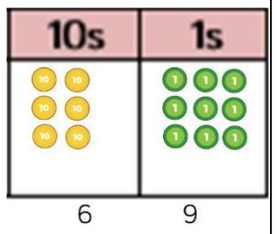
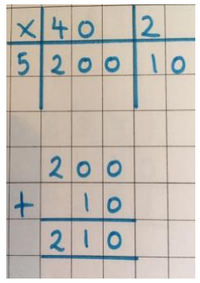
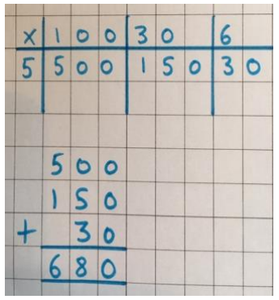
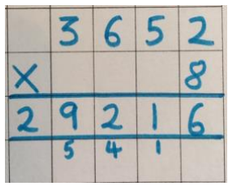
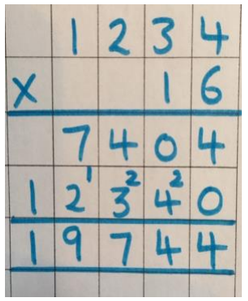
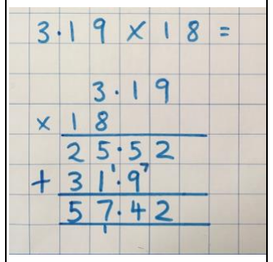
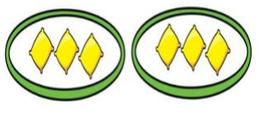
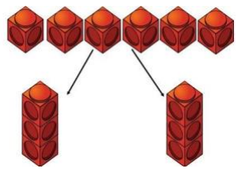
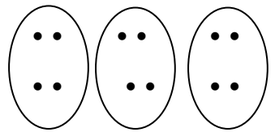
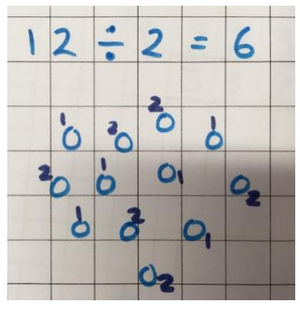
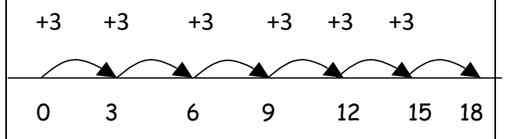
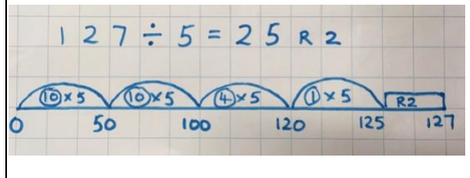
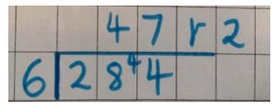
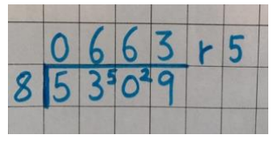
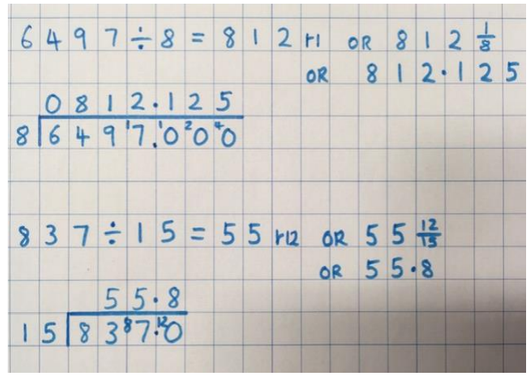
To further support teaching of mental calculations, consult the teaching of mental calculations booklet. (DFE 2010)

Aims of the policy

The Calculations Policy aims to ensure all pupils are competent in fluency, reasoning and problem solving and therefore;

- **Understand important concepts and make connections within mathematics**
- **Show high levels of fluency in performing written and mental calculations**
- **Are taught consistent calculation strategies**
- **Are ready for the next stage of learning**
- **Have a smooth transition between phases are able to add, subtract, multiply and divide efficiently.**

	Year R	The calculation policy is organised according to age stage expectations as set out in the National Curriculum 2014, **however it is vital that pupils are taught according to the stage that they are currently working at,** being moved onto the next level as soon as they are ready, or working at a lower stage until they are secure enough to move on. →							Year 6
Addition; + Key vocabulary Sum Total Parts and wholes Plus Add Altogether More 'is equal to' 'is the same as'	Concrete representation Combining two parts to  make a whole using any concrete item (teddies, fingers, cars, cakes) 	Counting on using concrete apparatus e.g. 3 + 2 = 5  Or using a bar model which encourages the children to count on rather than count all.  e.g. 3 + 2 =	Using a number line to count on  Progressing to drawing own number lines.  Using base 10. Continue to develop understanding of partitioning and place value.  41 + 8	Using base ten/Dienes representation  Progressing to partitioning with or without visual representation  10+10=20 2+3=5 20+5=25	Expanded column method 2 and 3 digit numbers  	Compact column method for 4 digits numbers and carrying digits  Progressing to decimal calculations 	Progressing to calculations using 5 digit numbers 	Calculating using 6 digit numbers and decimals  
Subtraction; – Key vocabulary Minus, subtract, take, take-away, less, leaves, difference between, how many more.	Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used). 4 – 3 = 1 	Counting back (using number lines or number tracks) children start with 6 and count back 2. 6 – 2 = 4  Or using bar model to count up 6 – 4 = 2 	Subtracting by drawing concrete apparatus and taking off e.g. 3 - 2 = 1  Using base ten/dienes representation 	Progressing to drawing own number lines Counting back ;  Then counting on to find the difference  	Column method without carrying ;  Column method with carrying ; 	Progressing to 5 digit calculations and decimals  	6 digit numbers and decimals  

Multiplication X Key vocabulary Groups of, lots of, times, array, altogether, multiply	Repeated grouping/repeated addition using concrete resources  There are 3 equal groups, with 4 in each group	Counters 4 x 3 (arrays)  Visual representation E.g. 3 x 2 = 6 	Repeated addition supported with numicon 3 x 3 = 3 +3 + 3 = 9 3 + 3 + 3 Progressing to repeated addition on a number line 4 x 3 =12  +3 +3 +3 +3 0 3 6 9 12	Progressing to two digit numbers X one digit numbers. E.g. 23 x 3 =69  10s 1s 6 9 Progressing to a grid	Grid method using 2 two digits x one digit number. e.g. 42 x 5 = 	Grid method using 2 three digits x one digit number. e.g. 136 x 5 = 	Multiplying using a column method.  Progressing to long multiplication method. 	Multiplying decimals 
Division ÷ Share, share equally, one each, two each, group, groups of, lots of, array	Sharing using a range of objects. 6 ÷ 2 = 3  	Using dots or tallies pictorially by grouping. E.g. 12 ÷ 3 = 4 	Sharing 	Progressing to using a blank number line; 18 ÷ 3 = 6 *How many groups of three in 18?*  +3 +3 +3 +3 +3 +3 0 3 6 9 12 15 18 Progressing to chunking ; 	Using a bus stop method for 3 digits ÷ 1 digit numbers :  Using a bus stop method for 4 digits ÷ 1 digit numbers : 	Calculating division using larger numbers and decimals ; 

Presentation expectations

All children expected to understand the presentation pledge and sign at the front of their maths books. To ensure consistency throughout the school the following is also expected;

- One symbol or number per square.
- Decimal point on line.
- Symbol to the left of the calculation.
- Fraction shown within one square, to demonstrate part of a number.
- Children to write number sentence out as well as calculation.
- Carried numbers to be shown below.

Frequently Asked Questions?

What if pupils join the school with a different method?

Discuss how their previous methods worked and show them how we complete the methods in our schools. Explain that everyone in the school can choose from the methods we teach and give them the chance to practice and understand how they work.

What if pupils 'can't' do the method?

If pupils 'can't' do the methods they are telling you that they do not have the understanding of number and need to revisit a stage. This will ensure they have the place value understanding to help them to complete the method. This will be at the teachers' discretion.

What if parents don't like the methods adopted?

Explain to the parents that we have chosen these methods as we feel this helps the children to understand why they have to complete certain steps to gain the answer. Offer the parents the chance to show them how the methods work and encourage them to use the same ones at home.

What if some teaching staff lack the confidence to support the methods?

If you are not confident in supporting the methods to the children then seek help yourself. Ask people within your year group or your Maths Subject leader and they would be willing to explain to you how you can help support the children to gain a better understanding.

What if the children confuse themselves between the methods?

This indicates a gap in their conceptual understanding. Revisit the preceeding stage (or more!) and ensure the children are aware of the differences between the methods given to them. Get the children to explore the differences between the different methods and how they all support/represent the same calculation.

APPENDIX

Curriculum Expectations

Number and Numerical patterns	Early Years – Teacher Assessment	Autumn *B.L	Term 1		Spring *B.L	Term 2		Summer *B.L	Term 3	
Children in Rec	Count objects, actions and sounds									
	Subitise									
	Link the number symbol (numeral) with its cardinal number value									
	Count beyond ten									
	Compare numbers									
	Understand the 'one more than/one less than' relationship between consecutive numbers									
	Explore the composition of numbers to 10									
	Automatically recall number bonds for numbers 0–5 and some to 10									
	Select, rotate and manipulate shapes in order to develop spatial reasoning skills									
	Compose and decompose shapes so that children recognise a shape can have other shapes within it, just as numbers can									
	Continue, copy and create repeating patterns									
	Compare length, weight and capacity									

Year 1

NUMBER – Number and place value.	NUMBER – Addition and Subtraction	NUMBER - Multiplication and Division	NUMBER - Fractions	MEASUREMENT	GEOMETRY - Properties of Shape	GEOMETRY – Position and direction

Pupils should be taught to:
• 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 different multiples including ones, twos, fives and tens
• given a number, identify one more and one less
• identify and represent numbers using concrete objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
• read and write numbers from 1 to 20 in digits and words.
	Pupils should be taught to:
	• read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
	• represent and use number bonds and related subtraction within 20
	• add and subtract one-digit and two-digit numbers to 20 (9 + 9, 18 - 9), including zero
	• solve simple one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems.
		Pupils should be taught to:
		• 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.
			Pupils should be taught to:
			• 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.
				Pupils should be taught to:
				• compare, describe and solve practical problems for:
				  • lengths and heights (for example, long/short, longer/shorter, tall/short, double/half)
				  • mass/weight (for example, heavy/light, heavier than, lighter than)
				  • capacity and volume (for example, full/empty, more than, less than, half, half full, quarter)
				  • time (for example, quicker, slower, earlier, later)
				• 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
				• sequence events in chronological order using language (for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening)
				• recognise and use language relating to dates, including days of the week, weeks, months and years
				• tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.
					Pupils should be taught to:
					• recognise and name common 2-D and 3-D shapes, including:
					  • 2-D shapes [for example, rectangles (including squares), circles and triangles]
					  • 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].
						Pupils should be taught to:
						• describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Year 2

NUMBER – Number and place value.	NUMBER – Addition and Subtraction	NUMBER – Multiplication and Division	NUMBER - Fractions	MEASUREMENT	GEOMETRY – Properties of Shape	GEOMETRY – Position and direction	STATISTICS - Data
Pupils should be taught to: • count in steps of 2, 3, and 5 from 0, and count in tens from any number, forward or backward. • recognise the place value of each digit in a two-digit number (tens, ones) • identify, represent and estimate numbers using different representations, including the number line • compare and order numbers from 0 up to 100; use <, > and = signs • read and write numbers to at least 100 in numerals and in words • *use place value and number facts to solve problems.*	Pupils should be taught to: • solve simple one-step 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 • recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 • 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* • recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.	Pupils should be taught to: • recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers • calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs • show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot • solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.	Pupils should be taught to: • recognise, find, name and write fractions , , and of a 31 41 42 43 length, shape, set of objects or quantity • *write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of two quarters and one half.*	Pupils should be taught to: • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); *temperature (°C);* capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • *compare and order lengths, mass, volume/capacity and record the results using* >, < and = • read relevant scales to the nearest numbered unit • recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value and match different combinations of coins to equal the same amounts of money; add and subtract money of the same unit, including giving change • solve simple problems in a practical context involving addition and subtraction of money • compare and sequence intervals of time • *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.	Pupils should be taught to: • *identify and describe the properties of 2-D shapes, including the number of sides and 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 • compare and sort common 2-D and 3-D shapes and everyday objects.	Pupils should be taught to: • order and arrange combinations of mathematical objects in patterns • use mathematical vocabulary to describe position, direction and movement, including distinguishing between rotation as a turn and in terms of right angles for quarter, half and *three-quarter turns* (clockwise and anti-clockwise), and movement in a straight line.	Pupils should be taught to: • 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 compare categorical data.

Year 3

NUMBER – Number and place value.	NUMBER – Addition and Subtraction	NUMBER – Multiplication and Division	NUMBER - Fractions	MEASUREMENT	GEOMETRY – Properties of Shape	GEOMETRY – Position and direction	STATISTICS - Data

Pupils should be taught to:
• count from 0 in multiples of 4, 8, 50 and 100; finding 10 or 100 more or less than a given number
• recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
• compare and order numbers up to 1000
• identify, represent and estimate numbers using different representations
• read and write numbers to at least 1000 in numerals and in words
• solve number problems and practical problems involving these ideas.
	Pupils should be taught to:
	• add and subtract numbers mentally, including:
	  • a three-digit number and ones
	  • a three-digit number and tens
	  • a three-digit number and hundreds
	• add and subtract numbers with up to three digits, using the efficient written methods of columnar addition and subtraction
	• estimate the answer to a calculation and use inverse operations to check answers
	• solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.
		Pupils should be taught to:
		• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
		• write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to efficient written methods
		• solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n objects involving multiplication and division, including integer scaling problems and correspondence problems in which n objects are connected to m objects.
			Pupils should be taught to:
			• count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
			• recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
			• recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
			• recognise and show, using diagrams, equivalent fractions with small denominators
			• add and subtract fractions with the same denominator within one whole (e.g. 5/7 + 1/7 = 6/7)
			• compare and order unit fractions with the same denominator
			• solve problems that involve all of the above.
				Pupils should be taught to:
				• measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
				• measure the perimeter of simple 2-D shapes
				• add and subtract amounts of money to give change, using both £ and p in practical contexts
				• 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
				• know the number of seconds in a minute and the number of days in each month, year and leap year
				• compare durations of events (for example to calculate the time taken by particular events or tasks).
					Pupils should be taught to:
					• draw 2-D shapes and make 3-D shapes using modelling
					• materials; recognise 3-D shapes in different orientations;
					• and describe them with increasing accuracy
					• recognise angles as a property of shape and associate angles with turning
					• 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, vertical, perpendicular and parallel lines in relation to other lines.
						Pupils should be taught to:
						•
							Pupils should be taught to:
							• interpret and present data using bar charts, pictograms and tables
							• solve one-step and two-step questions such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts and pictograms and tables.

Year 4

NUMBER – Number and place value.	NUMBER – Addition and Subtraction	NUMBER – Multiplication and Division	NUMBER - Fractions	MEASUREMENT	GEOMETRY – Properties of Shape	GEOMETRY – Position and direction	STATISTICS - Data
Pupils should be taught to: • count in multiples of 6, 7, 9, 25 and 1000 • find 1000 more or less than a given number • count backwards through zero to include negative numbers • recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones) • order and compare numbers beyond 1000 • identify, represent and estimate numbers using different representations • round any number to the nearest 10, 100 or 1000 • solve number and practical problems that involve all of the above and with increasingly large positive numbers • read Roman numerals to 100 (I to C) and understand how, over time, the numeral system changed to include the concept of zero and place value.	Pupils should be taught to: • add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate • estimate and use inverse operations to check answers to a calculation • solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	Pupils should be taught to: • recall multiplication and division facts for multiplication tables up to 12 × 12 • use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers • recognise and use factor pairs and commutatively in mental calculations • multiply two-digit and three-digit numbers by a one-digit number using formal written layout	Pupils should be taught to: • recognise and show, using diagrams, families of common equivalent fractions • count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten • 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 • identify, name and write equivalent fractions of a given fraction, including tenths and hundredths • add and subtract fractions with the same denominator. Decimals & Fractions • recognise and write decimal equivalents of any number of tenths or hundredths • recognise and write decimal equivalents to 1/4; 1/2; 3/4 • find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths • round decimals with one decimal place to the nearest whole number • compare numbers with the same number of decimal places up to two decimal places • solve simple measure and money problems involving fractions and decimals to two decimal places.	Pupils should be taught to: • convert between different units of measure (e.g. kilometre to metre; hour to minute) • measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres • find the area of rectilinear shapes by counting • estimate, compare and calculate different measures, including money in pounds and pence • read, write and convert time between analogue and digital 12 and 24-hour clocks • solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.	Pupils should be taught to: • compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes • identify acute and obtuse angles and compare and order angles up to two right angles by size • identify lines of symmetry in 2-D shapes presented in different orientations • complete a simple symmetric figure with respect to a specific line of symmetry.	Pupils should be taught to: • describe positions on a 2-D grid as coordinates in the first quadrant • describe movements between positions as translations of a given unit to the left/right and up/down • plot specified points and draw sides to complete a given polygon.	Pupils should be taught to: • interpret and present discrete data using bar charts and continuous data using line graphs • solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and simple line graphs.

Objectives highlighted in green are new to the curriculum for year four.

These objectives will need to be covered throughout the year. (Please see suggested coverage from Pearson Maths)

Mental Maths should still take place at the beginning of the lesson.

Year 5

NUMBER – Number and place value.	NUMBER – Addition and Subtraction	NUMBER – Multiplication and Division	NUMBER - Fractions	MEASUREMENT	GEOMETRY – Properties of Shape	GEOMETRY – Position and direction	STATISTICS - Data
Pupils should be taught to: • read, write, order and compare numbers to at least 1000000 and determine the value of each digit • count forwards or backwards in steps of powers of 10 for any given number up to 1000 000 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero • round any number up to 1 000 000 to the nearest 10, 100, 1000, 10000 and 100000 • solve number problems and practical problems that involve all of the above • read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	Pupils should be taught to: • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Pupils should be taught to: • 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 • multiply numbers up to 4 digits by a one-or two-digit number using a formal written method, including long multiplication for two-digit numbers • multiply and divide numbers mentally drawing upon known facts • divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 • recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³) • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign • solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Pupils should be taught to: • compare and order fractions whose denominators are all multiples of the same number • identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • recognise mixed numbers and improper fractions and convert from one form to the other • add and subtract fractions with the same denominator and related fractions; write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 11/5) • multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. Decimals & Fractions • read and write decimal numbers as fractions (e.g. 0.71 = 71/100) • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • round decimals with two decimal places to the nearest whole number and to one decimal place • read, write, order and compare numbers with up to three decimal places • solve problems involving number up to three decimal places. Percentages, decimals & fractions • 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 hundred, and as a decimal fraction • solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25.	Pupils should be taught to: • convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes • estimate volume (for example, using 1 cm³ blocks to build cuboids (including cubes)) and capacity (for example, using water) • solve problems involving converting between units of time • use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling.	Pupils should be taught to: • identify 3-D shapes, including cubes and other cuboids, from 2-D representations • know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • draw given angles, and measure them in degrees (°) • identify: • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) • other multiples of 90° • use the properties of rectangles to deduce related facts and find missing lengths and angles • distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	Pupils should be taught to: • 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. •	Pupils should be taught to: • solve comparison, sum and difference problems using information presented in line graphs • complete, read and interpret information in tables, including timetables.

Year 6

NUMBER – Number, place value and rounding.	NUMBER – Addition, subtraction, multiplication and division	NUMBER – Percentages, decimals and fractions	Ratio and Proportion	Algebra	Measurement	GEOMETRY – Properties of Shape	GEOMETRY – Position and direction	Statistics
Pupils should be taught to: • Read, write, order and compare numbers up to 10000000 and determine the value of each digit • round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above.	Pupils should be taught to: • multiply multi-digit numbers up to 4 digits by a two-digit • whole number using the formal written method of long multiplication • divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context • divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • perform mental calculations, including with mixed operations and large numbers • identify common factors, common multiples and prime numbers • use their knowledge of the order of operations to carry out calculations involving the four operations • solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why • solve problems involving addition, subtraction, multiplication and division • use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Pupils should be taught to: • use common factors to simplify fractions; use common multiples to express fractions in the same denomination • compare and order fractions, including fractions > 1 • add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions • multiply simple pairs of proper fractions, writing the answer in its simplest form (for example, $\frac{1}{4} \times \frac{1}{2} = 1/8$) • divide proper fractions by whole numbers (for example, 1/3 ÷ 2 = 1/6) • associate a fraction with division and calculate decimal fraction equivalents (for example, 0.375) for a simple fraction (for example, 3/8) • identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • multiply one-digit numbers with up to two decimal places by whole numbers • use written division methods in cases where the answer has up to two decimal places • solve problems which require answers to be rounded to specified degrees of accuracy • recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	Pupils should be taught to: • 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	Pupils should be taught to: • Use simple formulae generate and describe linear number sequences • express missing number problems algebraically • generate and describe linear number sequences • find pairs of numbers that satisfy an equation with two unknowns • enumerate possibilities of combinations of two variables.	Pupils should be taught to: • solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places • convert between miles and kilometres • recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use formulae for area and volume of shapes • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (for example, mm^3 and km^3). •	Pupils should be taught to: • draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3-D shapes, including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter •	Pupils should be taught to: • 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. •	Pupils should be taught to: • interpret and construct pie charts and line graphs and use these to solve problem • calculate and interpret the mean as an average. •