Boasley Cross Primary School Maths curriculum

We believe children need to basic mathematical operational skills at an early age to develop their conceptional knowledge as they progress through the school. We aim for all children to be confident mathematicians who are able to apply their knowledge and skills to a range of situations. Children should be fluent in mathematical concepts and be able to apply their knowledge in both written and mental calculations.

Upon leaving Boasley Cross, we want our children to be confident mathematicians in the world around them, to be able to explore and make the most of their daily experience of maths. Through maths children can find joy in patterns, shape and calculations as well as its practical applications.

Our maths curriculum broadly follows the 'White Rose' maths schemes of work. Our approach meets the needs of many types of learner – we use manipulatives to physically show mathematics, images to show how maths can be represented, calculations and explanations. Children are challenged to experiment, explore and investigate mathematical theories and principles to further their understanding. Mental arithmetic is practised daily as part of our maths lessons. As a school we encourage children to make connections across the curriculum, maths is a vital skill throughout their learning, including science, computing, geography and others.

Every maths unit has an elicitation and application task which clearly shows misconceptions and progress respectively. This data is inputted to our online data management system, Classroom Monitor. In addition, we apply nationally standardised tests 3 times a year to ensure progress.

Programme of study

We use the National Curriculum 2014 for our programme of study in Maths.

Progression of maths

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Place Value Counting	count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number count numbers to 100, count in different multiples including ones, twos, fives and tens	count in steps of 2, 3, and 5 from 0, and count in tens from any number, forward or backward	count from 0 in multiples of 4, 8, 50 and 100; finding 10 or 100 more than a given number	count in multiples of 6, 7, 9, 25 and 100 count backwards through zero to include negative numbers	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 count forwards and backwards with positive and negative whole numbers through zero	
Place Value Represent	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 to 100 in numerals read and write numbers 1 to 20 in numerals and words	read and write numbers to at least 100 in numerals and in words identify, represent and estimate numbers using different representation, including the number line	identify, represent and estimate numbers using different representations read and write numbers to at least 1000 in numerals and in words	identify, represent and estimate numbers using different representations 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	read, write numbers to at least 1 000 000 and determine the value of each digit read Roman numerals to 1000 (M) and recognise years written in Roman numerals	read, write, numbers up to 10 000 000 and determine the value of each digit

Place Value Use PV and Compare	given a number, identify one more and one less	recognise the value of each digit in a two-digit number (tens, ones) compare and order numbers from 0 up to 100; use <, > and = signs	recognise the place value of each digit in a three-digit number (hundreds, tens, ones) compare and order numbers up to 1000	find 1000 more or less than a given number recognise the place value of each digit in a four-digit number (thousands, hundreds, tens and ones) order and compare numbers beyond 1000	order and compare numbers to at least 1 000 000 and determine the value of each digit	order and compare numbers up to 10 000 000 and determine the value of each digit
Place Value Problems and rounding		use place value and number facts to solve problems	solve number problems and practical problems involving these ideas	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	interpret negative numbers in context, round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 solve number problems and practical problems that involve all of the above	round any whole number to a required degree of accuracy use negative numbers in context, and calculate intervals across zero solve number problems and practical problems that involve all of the above

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition and subtraction Recall, represent, use	read, write and interpret mathematical statements involving addition (+), subtraction (-), and equals (=) signs 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 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 missing number problems	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	

Addition and subtraction Calculations	add and subtract one-digit and two-digit numbers to 20, including zero	add and subtract numbers using concrete objects, pictorial representations, and mentally, including: ○ a two-digit number and ones ○ a two-digit number and tens ○ two two-digit numbers adding three one-digit numbers	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 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) add and subtract numbers mentally with increasingly large numbers	
Addition and subtraction Solve problems	solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 =□ - 9	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	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

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Multiplication and division Recall, represent, use		recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even number show that multiplications of two numbers can be done in any order (commutative) and division of one number by another cannot	recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables	recall multiplication and division facts for multiplication tables up to 12 x 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	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 notations, (^{2}) (^{3})	identify common factors, common multiples and prime numbers use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy
Multiplication and division Calculations		calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs	write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including two-digit numbers times one-digit numbers, using	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	multiply multi-digit numbers up to 4 digits by a two-digit whole number using the efficient written method of long multiplication divide numbers up to 4 digits by a two-digit

			mental and progressing to formal written methods		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	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 context perform mental calculations, including with mixed operations and large numbers
Multiplication and division Solve problems	solve one step problems involving multiplication and division, calculating the answer using concrete objects, pictorial representations and arrays with the	solve problems involving multiplication and division, using materials arrays, repeated addition, mental methods, and multiplication and division facts,	solve problems, including missing number problems, involving multiplication and division, including integer scaling problems and correspondence problems in which n	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	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

	support of the teacher	including problems in contexts	objects are connected to m objects	which n objects are connected to m objects	solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates	
Multiplication and division Combined Operations					solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign	using their knowledge of the order of operations to carry out calculations involving the four operations

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions Recognise and write	recognise, find and name a half as one of two equal parts of an object, shape or quantity recognise, find and name a quarter as one of four equal parts of an object, shape or quantity	recognise, find name and write fractions 1/3 , 1/4, 2/4, and 3/4 of a length, shape, set of objects or quantity write simple fractions e.g. 1/2 of 6 = 3	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	count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten	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 to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5)	
Fractions Compare		recognise the equivalent of two quarters and one half	recognise and show, using diagrams, equivalent fractions with small denominators	recognise and show, using diagrams, families of common equivalent fractions	compare and order fractions whose denominators are all multiples of the same number	use common factors to simplify fractions; use common multiples to express fractions in the same denomination

			compare and order unit fractions with the same denominators			compare and order fractions including fractions >1
Fractions Calculations		write simple fractions e.g. 1/2 of 6 = 3	add and subtract fractions with the same denominator within one whole (e.g. 5/7 + 1/7 = 6/7)	add and subtract fractions with the same denominator	add and subtract fractions with the same denominator and denominators that are multiples of the same number multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams	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 (e.g. ¼ x ½ = 1/8) divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)
Fractions Solve problems			solve problems that involve all of the above	solve simple measures and money problems involving fractions and decimals to two decimal places		

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Decimals Recognise and write				recognise and write decimal equivalents of any number of tenths or hundredths recognise and write decimal equivalents to 1/4 ; 1/2, 3/4	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	identify the value of each digit in numbers given to three decimal places
Decimals Compare				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	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 3 decimal places	
Decimals Calculations and problems				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	solve problems involving numbers up to 3 decimal places	multiply one-digit numbers with up to two decimal places by whole numbers multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places 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

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Fractions, Decimals and Percentages				solve simple measures and money problems involving fractions and decimals to two decimal places	recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/+, 2/+, 4/+ and those frac- tions with a denominator of a multiple of 10 or 25	associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8) recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Ratio and Proportion						solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts solve problems involving the calculation of percentages (e.g 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

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Algebra						use simple formulae generate and describe linear number sequences express missing number problems algebraically find pairs of numbers that satisfy an equation with two unknowns enumerate possibilities of combinations of two variables

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Measurement Using Measures	• compare, describe and solve practical problems for: ○ lengths and heights (e.g. long/short, longer/ shorter, tall/short, double/half) ○ mass or weight (e.g. heavy/light, heavier than, lighter than)	choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels	measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)	convert between different units of measure (e.g. kilometre to metre; hour to minute) estimate, compare and calculate different measures, including money in pounds and pence	convert between different units of measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) understand and use approximate equivalences between metric units and	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

	○ capacity/volume (e.g. full/empty, more than, less than, half, half full, quarter) ○ time (e.g. quicker, slower, earlier, later) Measure and begin to record the following: ○ lengths and heights ○ mass/weight ○ capacity and volume ○ time (hours, minutes, seconds)	compare and order lengths, mass, volume/ capacity and record the results using <, > and =			common imperial units such as inches, pounds and pints use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation, including scaling	measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places convert between miles and kilometres
Measurement Money	recognise and know the value of different denominations of coins and notes	recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value find different combinations of coins that equal the same amounts of money solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change	add and subtract amounts of money giving change, using both £ and p in practical contexts	estimate, compare and calculate different measures, including money in pounds and pence	use all four operations to solve problems involving measure (for example, length, mass, volume, money) using decimal notation	

Measurement Time	sequence events in chronological order using language (e.g. before, after, next, first, today, tomorrow, morning, afternoon and evening) recognise and use the 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	compare and sequence intervals of time tell and write time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times know the number of minutes in an hour and the number of hours in a day	tell and write the time from an analogue clock, including using Roman numerals from 1 to X11, and 12 hour and 24-hour clocks estimate and read time to the nearest minute; record and compare time in terms of seconds, minutes, hours and o'clock; use vocabulary such as am/pm, 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	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	solve problems involving converting between units of time	use, read, write and convert between standard units of time

			compare durations of events, for example to calculate the time taken by particular events or tasks.			
Measurement Perimeter, area and volume			measure the perimeter of simple 2-D shapes	measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres find the area of rectilinear shapes by counting	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 (cm^2) and square metres (m^2) and estimate the area of irregular shapes estimate volume (e.g. using 1 cm^3 blocks to build cuboids (including cubes)) and capacity (e.g. using water)	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 (e.g. mm^3 and km^3)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Geometry 2D Shapes	recognise and name common 2-D shapes (e.g. rectangles (including squares), circles and triangles)	identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line 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 shapes and everyday objects	draw 2-D shapes	compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes identify lines of symmetry in 2-D shapes presented in different orientations	use the properties of a rectangle 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	draw 2D shapes using given dimensions and angles compare and classify geometric shapes based on their properties and sizes illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
Geometry 3D shapes	Recognise 3-D shapes (e.g. cuboids (including cubes), pyramids and spheres)	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 3-D shapes and everyday objects	make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations; and describe them with increasing accuracy		identify 3-D shapes, including cubes and cuboids, from 2-D representations	recognise, describe and build simple 3-D shapes, including making nets

Geometry Angles and lines			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 and vertical lines and pairs of perpendicular and parallel lines	identify acute and obtuse angles and compare and order angels 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	know angles are measured in degrees; estimate and compare acute, obtuse and reflex angles draw given angles, measuring them in degrees (°) identify ○ angles at a point and one whole turn (total 360°) ○ angles at a point on a straight line and ½ a turn (total 180°) other multiples of 90˚	find unknown angles in any triangles, quadrilaterals and regular polygons recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

Geometry Position and direction	describe position, directions and movements, including half, quarter and three-quarter turns	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/anti-clockwise)		describe positions on a 2-D grid as coordinates in the first quadrant describe movement 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	identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed	describe positions on the full coordinate grid (all four quadrants) draw and translate simple shapes on the coordinate plane, and reflect them in the axes

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Statistics Present and interpret		Interpret and construct simple pictograms, tally charts, block diagrams and simple tables	interpret and present data using bar charts, pictograms and tables	interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs	complete, read and interpret information in tables, including timetables	interpret and construct pie charts and line graphs and use these to solve problems
Statistics Solve problems		ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity ask and answer questions about totalling and compare categorical data	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	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