National Curriculum 2017-18 Mathematics Objectives

CAMELOT PRIMARY SCHOOL

"Inspiring and developing mathematicians"

Aims of Curriculum

The new curriculum aims to ensure that all pupils:

- Become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that all pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- Can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking problems down into a series of simpler steps and persevering in seeking solutions

Guidelines

These objectives are taken from the new National Curriculum in England published in July 2013. They cover the key aspects of Mathematics to be taught throughout Key Stage 1 and Key Stage 2.
The Key Aspects are:

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions
- Geometry
- Measures
- Statistics

We need to ensure that all the topics are covered within a long term and that they are revisited regularly. However, there is flexibility as to when different aspects are taught, allowing teachers to plan to meet the needs of their class as well as providing considerable scope for developing cross curricular links.

The objectives in this document are to be used when planning for learning in Mathematics from Year 1 to Year 6 throughout the school year. There are also some notes which unpick the meaning and implications of these objectives. This is just guidance and is not a checklist to be followed. In addition to this, teachers should ensure that they are planning opportunities for the children to:

- Practise their mental maths skills including number facts and times tables
- Develop their mathematical ideas, thinking and reasoning through talk
- Use and apply the ideas and concepts which they have been learning in a variety of different situations.

Progression and expectations for each phase

Key Stage 1	The focus in KS 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involved working with numerals, words and the four operations, including with practical resources. Pupils should also develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money. By the end of Year 2 pupils should know the number bonds to 20 and be precise in using and understanding place value. Pupils should read and spell mathematical vocabulary at a level consistent with their increasing word reading and spelling knowledge at KS 1.
Lower Key Stage 2	The focus in lower KS2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. Pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of Year 4 children should have memorised their multiplication tables up to and include the 12 multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.
Upper Key Stage 2	The focus in upper KS2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. Pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. Pupils are introduced to the language of algebra as a means of solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of Year 6 pupils should be fluent in written methods for all four operations including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

It is expected that the majority of pupils will move through the programmes of study at broadly the same pace. Decisions about when to move children on should always be based on the security of their understanding and their readiness to progress to the next stage. Children who grasp concepts rapidly should be challenging through being offered richer, sophisticated and open-ended problems before any acceleration through new content. Those who are not sufficiently confident with earlier material should consolidate their understanding before moving on. The requirement is that children have completed the programme of study before the end of the Key Stage which means we have the flexibility to introduce content earlier or later than set out in the programme of study.

Objectives for Year 1

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To count up to and past 100 forwards and backwards starting from any numbers						
To read and write numbers to 100 in numerals						
To count in multiples of two, fives and tens						
To identify one more and one less from a given number						
To identify and represent numbers using objects and pictorial representations, including on a number line						
To compare numbers using the language of equal to, more than, less than (fewer), most, least						
To read and write numbers from 1 to 20 in words						

NUMBER: Addition and Subtraction						
	1	2	3	4	5	6
To read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs						
To represent and use number bonds and related subtraction facts within 20 by combining and counting on/back						
To add and subtract one-digit and two-digit numbers to 20, including zero						
To solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations						
To solve missing number problems such as 7 = ? – 9.						

NUMBER: Multiplication and Division						
	1	2	3	4	5	6
To solve one-step problems involving multiplication and division, calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher						

NUMBER: Fractions						
	1	2	3	4	5	6
To recognise, find and name a half as one of two equal parts of an object, shape and quantity						
To recognise, find and name a quarter as one of four equal parts of an object, shape or quantity						

MEASUREMENT						
	1	2	3	4	5	6
To 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) - Capacity/volume (full/empty, more than, less than, quarter) - Time (e.g. quicker, slower, earlier, later)						
To measure and begin to record the following: - Lengths and heights - Mass/weight - Capacity and volume - Time (hours, minutes, seconds)						
To recognise and know the values of different denominations of coins and notes						
To sequence events in chronological order using language (such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening						
To recognise and use language relating to dates, including days of the week, months, and years						
To tell the time to the hour and half past the hour and draw the hands on a clock face to show these times						

GEOMETRY: Properties of Shape and Position and Direction						
	1	2	3	4	5	6
To recognise and name common 2-D and 3-D shapes including: - 2D shapes (e.g. rectangles including squares, circles and triangles) - 3D shapes (e.g. cuboids including cubes, pyramids and spheres)						
To describe position, directions and movements, including half, quarter and three quarter turns.						

Year 1 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value
- Pupils practise counting (1, 2, 3), ordering (e.g. first, second, third), or to indicate a quantity (e.g. 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.   - Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.   - They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (e.g. odd and even numbers), including varied and frequent practice through increasingly complex questions.   - They recognise and create repeating patterns with objects and with shapes.

NUMBER: Addition and Subtraction
- Pupils memorise and reason with number bonds to 10 and 20 in several forms (e.g. 9 + 7 = 16; 16 - 7 = 9; 7 = 16 - 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.   - Pupils combine and increase numbers, counting forwards and backwards.   - They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, distance between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

NUMBER: Multiplication and Division
- Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.   - They make connections between arrays, number patterns, and counting in twos, fives and tens.

NUMBER: Fractions
Pupils are taught half and quarter as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.

MEASUREMENT
- The pairs of terms: mass and weight, volume and capacity, are used interchangeably at this stage.   - Pupils move from using and comparing different types of quantities and measures using non-standard units, including discrete (e.g. counting) and continuous (e.g. liquid) measurement, to using manageable common standard units.   - In order to become familiar with standard measures, pupils begin to use measuring tools such as a ruler, weighing scales and containers.   - Pupils use the language of time, including telling the time throughout the day, first using o'clock and then half past.

GEOMETRY: Properties of Shape
• Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently. They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids can be different shapes.

GEOMETRY: Position and Direction
• They use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside. • Pupils make half, quarter and three-quarter turns and routinely make these turns in a clockwise direction.

Objectives for Year 2

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To count in steps of 2, 3 and 5 from 0, and in tens from any number, forward or backward						
To recognise the place value of each digit in a two-digit number (tens and ones)						
To identify, represent and estimate numbers using different representations, including the number line						
To compare and order numbers to 100 using <, > and = signs						
To read and write numbers to at least 100 in numerals and in words						
To use place value and number facts to solve problems						

NUMBER: Addition and Subtraction						
	1	2	3	4	5	6
To solve problems with addition and subtraction using concrete objects and pictorial representations, including those involving numbers, quantities and measures						
To solve problems with addition and subtraction applying their increasing knowledge of mental and written methods						
To recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100						
To add and subtract numbers using concrete objects, pictorial representations, and mentally including: a two-digit number and a one-digit number, a two-digit number and a multiple of 10, two-digit numbers, three one-digit numbers						
To show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot						
To recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems						

NUMBER: Multiplication and Division						
	1	2	3	4	5	6
To recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers						
To calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) signs						
To show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot						

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

NUMBER: Fractions

	1	2	3	4	5	6
To recognise, find and write fractions 1/3, ¼, 2/4, ¾ of a length, shape, set of objects or quantity						
To write simple fractions e.g. ½ of 6 = 3 and recognise the equivalence of 2/4 and ½						

MEASUREMENT

	1	2	3	4	5	6
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						
To compare and order lengths, mass, volume/capacity and record the results using <, > and =						
To recognise and use symbols for (£) and pence (p); combine the amounts to make a particular value						
To find different combinations of coins that equal the same amounts of money						
To solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change						
To compare and sequence intervals of time						
To 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						

GEOMETRY: Properties of Shapes

	1	2	3	4	5	6
To identify and describe the properties of 2D shapes, including the number of sides and symmetry in a vertical line						
To identify and describe the properties of 3D shapes, including the number of edges, vertices and faces						
To identify 2D shapes on the surface of 3D shapes, for example a circle on a cylinder and a triangle on a pyramid						
To compare and sort common 2D and 3D shapes and everyday objects						

GEOMETRY: Position and Direction

	1	2	3	4	5	6
To order and arrange combinations of mathematical objects in patterns						
To 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						

STATISTICS						
	1	2	3	4	5	6
To interpret and construct simple pictograms, tally charts, block diagrams and simple tables						
To ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity						
To ask and answer questions about totalling and comparing categorical data						

Year 2 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value
• Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third. • As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations. • Pupils should partition numbers in different ways (e.g. 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.

NUMBER: Addition and Subtraction
• Pupils extend their understanding of the language of addition and subtraction to include sum and difference. • Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using 3 + 7 = 10, 10 - 7 = 3 and 7 = 10 - 3 to calculate 30 + 70 = 100, 100 - 70 = 30 and 70 = 100 - 30. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (e.g. 5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5). This establishes commutativity and associativity of addition. • Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

NUMBER: Multiplication and Division
• Pupils use a variety of language to describe multiplication and division. • Pupils are introduced to the multiplication tables. They practise to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 multiplication table to place value, and the 5 multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations. • Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, and relating these to fractions and measures (e.g. $40 \div 2 = 20$, 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (e.g. $4 \times 5 = 20$ and $20 \div 5 = 4$).

NUMBER: Fractions
• Pupils use additional fractions as 'fractions of' discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantity, a set of objects or shapes. They meet $\frac{3}{4}$ as the first example of a non-unit fraction.

- Pupils should count in fractions up to 10, starting from any number and using the $\frac{1}{2}$ and $\frac{2}{4}$ equivalence on the number line (e.g. $1\frac{1}{4}$, $1\frac{2}{4}$ (or $1\frac{1}{2}$), $1\frac{3}{4}$, 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.

MEASUREMENT
- Pupils use standard units of measurement with increasing accuracy, using their knowledge of the number system. They use the appropriate language and record using standard abbreviations.
- They become fluent in telling the time on analogue clocks and recording it.
- Pupils become fluent in counting and recognising coins. They read and say amounts of money confidently and use the symbols £ and p accurately, recording pounds and pence separately.

GEOMETRY: Properties of Shapes
- Pupils handle and name a wider variety of common 2-D and 3-D shapes including: quadrilaterals and cuboids, prisms, cones and polygons, and identify the properties of each shape (e.g. number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces.
- Pupils read and write names for shapes that are appropriate for their word reading and spelling.
- Pupils draw lines and shapes using a straight edge.

GEOMETRY: Position and Direction
- Pupils should work with patterns of shapes, including those in different orientations.
- Pupils should use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (e.g. pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).

STATISTICS
- Pupils record, interpret, collate, organise and compare information (e.g. using many-to-one correspondence with simple ratios 2, 5, 10).

Objectives for Year 3

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To count from 0 in multiples of 4, 8, 50, and 100						
To find 10 or 100 more or less than a given numbers						
To recognise the place value of each digit in a three-digit number (hundreds, tens and ones)						
To compare and order numbers up to 1000						
To identify, represent and estimate numbers using different representations						
To read and write numbers up to 1000 in numerals and in words						
To solve number problems and practical problems involving these ideas						

NUMBER: Addition and Subtraction						
	1	2	3	4	5	6
To add and subtract mentally including: a three-digit number and a one-digit number, a three-digit number and a multiple of 10, a three-digit number and a multiple of 100.						
To add and subtract numbers with up to three digits, using formal written methods of column addition and subtraction						
To estimate the answer to a calculation and use the inverse operation to check answers						
To solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction						

NUMBER: Multiplication and Division						
	1	2	3	4	5	6
To recall and use multiplication facts and division facts for the 3, 4 and 8 multiplication tables						
To write and calculate mathematical statements for multiplication and division using the multiplication tables what they know, including for two-digit times one-digit numbers, using mental and progressing to formal written methods						
To solve problems, involving missing number problems, involving multiplication and division, including integer scaling problems and						

correspondence problems in which 'n' objects are connected to 'm' objects						

NUMBER: Fractions						
	1	2	3	4	5	6
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						
To recognise, find and write fractions of a discrete set of objects, unit fractions and non-unit fractions with small denominators						
To recognise and use fractions as numbers; unit fractions and non-unit fractions with small denominators						
To recognise and show, using diagrams, equivalent fractions with small denominators						
To add and subtract fractions with the same denominator within on whole (e.g. 5/7 + 1/7 = 6/7)						
To compare and order unit fractions, and fractions with the same denominators						
To solve problems that involve all of the above						

MEASUREMENT						
	1	2	3	4	5	6
To measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)						
To measure the perimeter of simple 2D shapes						
To add and subtract amounts of money to give change using both £ and p in practical contexts						
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						
To 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						
To know the number of seconds in a minute and the number of days in each month, year or leap year						
To compare durations of events, for example to calculate the time take by particular events or tasks						

GEOMETRY: Properties of Shapes						
	1	2	3	4	5	6
To draw 2D shapes and make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them						
To recognise that angles are a property of shape or a description of a turn						
To 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						
To identify horizontal and vertical lines and pairs of perpendicular and parallel lines						

STATISTICS						
	1	2	3	4	5	6
To interpret and present data using bar charts, pictograms and tables						
To 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 3 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value

- Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100.
- They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (e.g. 146 = 100 and 40 and 6, 146 = 130 and 16).
- Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.

NUMBER: Addition and Subtraction

- Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.
- Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent (see Appendix 1).

NUMBER: Multiplication and Division

- Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.
- Pupils develop efficient mental methods, for example, using commutativity (e.g. $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (e.g. using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts ($30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).
- Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.
- Pupils solve simple problems in contexts, deciding which of the four operations to use and why, including measuring and scaling contexts, and correspondence problems in which m objects are connected to n objects (e.g. 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

NUMBER: Fractions

- Pupils connect tenths to place value, decimal measures and to division by 10.
- They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the [0, 1] interval, relating this to measure.
- Pupils understand the relation between unit fractions as operators (fractions of), and division by integers.

- They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, or unit fractions as a division of a quantity.
- Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.

MEASUREMENT
- Pupils continue to measure using the appropriate tools and units, progressing to using a wider range of measures, including comparing and using mixed units (e.g. 1 kg and 200g) and simple equivalents of mixed units (e.g. 5m = 500cm).
- The comparison of measures should also include simple scaling by integers (e.g. a given quantity or measure is twice as long or five times as high) and this should connect to multiplication.
- Pupils continue to become fluent in recognising the value of coins, by adding and subtracting amounts, including mixed units, and giving change using manageable amounts. They record £ and p separately. The decimal recording of money is introduced formally in year 4.
- Pupils use both analogue and digital 12-hour clocks and record their times. In this way they become fluent in and prepared for using digital 24-hour clocks in year 4.

GEOMETRY: Properties of Shapes
- Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra. Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle.
- Pupils should draw and measure straight lines in centimetres.

STATISTICS
- Pupils understand and use simple scales (e.g. 2, 5, 10 units per cm) in pictograms and bar charts with increasing accuracy.
- They continue to interpret data presented in many contexts.

Objectives for Year 4

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To count in multiples of 6, 7, 9, 25 and 1000						
To find 1000 more or less than a given number						
To count backwards through zero to include negative numbers						
To recognise the place-value of each digit in a four-digit number (thousands, hundreds, tens and ones)						
To order and compare numbers beyond 1000						
To identify, represent and estimate numbers using different representations						
To round any number to the nearest 10, 100 or 1000						
To solve number and practical problems that involve all of the above and with increasingly larger positive numbers						
To read Roman numerals to 100 (I to C) and know that over time, the numeral system has changed to include the concept of zero and place value						

NUMBER: Addition and Subtraction						
	1	2	3	4	5	6
To add and subtract numbers with up to 4 digits using the formal written methods of column addition and subtraction where appropriate						
To estimate and use inverse operations to check answers to a calculation						
To solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why						

NUMBER: Multiplication and Division						
	1	2	3	4	5	6
To recall multiplication and division facts for multiplication tables up to 12x12						
To 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						

	1	2	3	4	5	6
To recognise and use fact pairs and commutativity in mental calculations						
To multiply two-digit and three-digit numbers by a one-digit number using formal written layout						
To solve problems involving multiplying and adding, including using the distributative 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						

NUMBER: Fractions (including decimals)						
	1	2	3	4	5	6
To recognise and show, using diagrams, families of common equivalent fractions						
To count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten						
To 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						
To add and subtract fractions with the same denominator						
To recognise and write decimal equivalents of any number of tenths or hundredths						
To recognise and write decimal equivalents ¼; ½; ¾						
To find the effect of dividing a one-digit or two-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths						
To round decimals with one decimal place to the nearest whole number						
To compare numbers with the same number of decimal places up to two decimal places						
To solve simple measures and money problems involving fractions and decimals to two decimal places						

MEASUREMENTS						
	1	2	3	4	5	6
To convert between different units of measure (e.g. kilometre to metre, hour to minute)						
To measure and calculate perimeter of a rectilinear figure (including squares) in centimetres and metres						
To find the area of rectilinear shapes by counting squares						
To estimate, compare and calculate different measures, including money in pounds and pence						
To read, write and convert time between analogue and digital 12 and 24-hour clocks						
To solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.						

GEOMETRY: Properties of Shapes						
	1	2	3	4	5	6
To compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes						
To identify acute and obtuse angles and compare and order angles up to two right angles by size						
To identify lines of symmetry in 2D shapes presented in different orientations						
To complete a simple symmetric figure with respect to a specific line of symmetry						

GEOMETRY: Position and Direction						
	1	2	3	4	5	6
To describe positions on 2D grid as coordinates in the first quadrant						
To describe movements between positions as translations of a given unit to the left/right and up/down						
To plot specific points and draw sides to complete a given polygon						

STATISTICS						
	1	2	3	4	5	6
To interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs						
To solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs						

Year 4 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value
- Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice.   - They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.   - They connect estimation and rounding numbers to the use of measuring instruments.   - Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.

NUMBER: Addition and Subtraction
Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency (see Appendix 1).

NUMBER: Multiplication and Division
- Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.   - Pupils practise mental methods and extend this to three-digit numbers to derive facts, for example 200 × 3 = 600 into 600 ÷ 3 = 200.   - Pupils practise to become fluent in the formal written method of short multiplication for multiplying using multi-digit numbers, and short division with exact answers when dividing by a one-digit number (see Appendix 1).   - Pupils write statements about the equality of expressions (e.g. use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4)). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 x 6 x 5 = 10 x 6.   - Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.

NUMBER: Fractions (including decimals)
- Pupils should connect hundredths to tenths and place value and decimal measure.   - They extend the use of the number line to connect fractions, numbers and measures.   - Pupils understand the relation between non-unit fractions and multiplication and division of quantities, with particular emphasis on tenths and hundredths   - Pupils make connections between fractions of a length, of a shape and as a representation of one whole or set of quantities. Pupils use factors and multiples to recognise equivalent fractions and simplify where appropriate (e.g. $\frac{6}{9} = \frac{2}{3}$ or $\frac{1}{4} = \frac{2}{8}$).   - Pupils continue practice in adding and subtracting fractions with the same denominator, to become fluent through a variety of   - increasingly complex problems beyond one whole.   - Pupils are taught throughout that decimals and fractions are different ways of expressing numbers and proportions.   - Pupils' understanding of the number system and decimal place value is extended at this stage to tenths and then hundredths. This includes relating the decimal notation to division of whole number by 10 and later 100.   - They practise counting using simple fractions and decimal fractions, both forwards and backwards.   - Pupils learn decimal notation and the language associated with it, including in the context of measurements. They make comparisons and order decimal amounts and quantities that are expressed to the same number of decimal places. They should be able to represent numbers with one or two decimal places in several ways, such as on number lines.

MEASUREMENT
- Pupils build on their understanding of place value and decimal notation to record metric measures, including money.   - They use multiplication to convert from larger to smaller units.   - Perimeter can be expressed algebraically as 2(a + b) where a and   - b are the dimensions in the same unit.   - They relate area to arrays and multiplication.

GEOMETRY: Properties of Shape
- Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (e.g. isosceles, equilateral, scalene) and quadrilaterals (e.g. parallelogram, rhombus, trapezium).   - Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular.   - Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the reflected shape.

GEOMETRY: Position and Direction
• Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates (2, 5) including using coordinate-plotting ICT tools.

STATISTICS
• Pupils understand and use a greater range of scales in their representations. • Pupils begin to relate the graphical representation of data to recording change over time.

Objectives for Year 5

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To read, write, order and compare numbers to at least 1,000,000 and determine the value of each digit						
To count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000						
To interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero						
To round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000						
To solve number problems and practical problems that involved all of the above						
To read Roman numerals to 1000 (M) and recognise years written in Roman numerals						

NUMBER: Addition and Subtraction						
	1	2	3	4	5	6
To add and subtraction whole numbers with more than 4 digits including formal written methods (column addition and subtraction)						
To add and subtract numbers mentally with increasingly large numbers						
To use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy						
To solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why						

NUMBER: Multiplication and Division						
	1	2	3	4	5	6
To identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers						
To solve problems involving multiplication and division where larger numbers are used by decomposing them into their factors						
To know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers						
To establish whether a number up to 100 is prime and recall prime numbers up to 19						

	1	2	3	4	5	6
To multiply numbers up to 4 digits by a one-digit or two-digit number using a formal written method, including long multiplication for two-digit numbers						
To multiply and divide numbers mentally drawing upon known facts						
To divide numbers up to 4 digits by a one-digit number using a formal written method of short division and interpret remainders appropriately for the context						
To multiply and divide whole numbers and those involving decimals by 10, 100 and 1000						
To recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})						
To solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign						
To solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates						

NUMBER: Fractions (including decimals and percentages)						
	1	2	3	4	5	6
To compare and order fractions whose denominators are all multiples of the same number						
To identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths						
To recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number (e.g. 2/5 + 4/5 = 6/5 = 1 1/5)						
To add and subtract fractions with the same denominator and multiples of the same number						
To multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams						
To read and write decimal numbers as fractions (e.g. 0.71 = 71/100)						
To recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents						
To round decimals with two decimal places to nearest whole number and to one decimal place						
To read, write, order and compare numbers with up to three decimal places						
To solve problems involving number up to three decimal places						
To recognise the percent symbol (%) and understand that percent relates to 'number of parts per hundred,' and write percentages as a fraction with denominator hundred, and as a decimal fraction						
To solve problems which require knowing percentage and decimal equivalents of ½, ¼, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25						

MEASUREMENT						
	1	2	3	4	5	6

To convert between different units of metric measurement (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)						
To understand and use equivalences between metric units and common imperial units such as inches, pounds and pints						
To measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres						
To calculate and compare the area of squares and rectangles including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes						
To estimate volume (e.g. using 1 cm³ blocks to build cubes and cuboids) and capacity (e.g. using water)						
To solve problems involving converting between units of time						
To use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling						

GEOMETRY: Properties of Shape						
	1	2	3	4	5	6
To identify 3D shapes, including cubes and other cuboids, from 2D representations						
To know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles						
To draw given angles, and measure them in degress (°)						
To identify: - Angles at a point and one whole turn (360°) - Angles at a point on a straight line and ½ a turn (total 180°) - Other multiples of 90°						
To use the properties of rectangles to deduce related facts and find missing lengths ad angles						
To distinguish between regular and irregular polygons based on reasoning about equal sides and angles						

GEOMETRY: Position and Direction						
	1	2	3	4	5	6
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						

STATISTICS						
	1	2	3	4	5	6
To solve comparison, sum and difference problems using information presented in a line graph						
To complete, read and interpret information in tables, including timetables						

Year 5 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value

- Pupils identify the place value in large whole numbers.
- They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.
- They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.

NUMBER: Addition and Subtraction

- Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency (see Appendix 1).
- They practise mental calculations with increasingly large numbers to aid fluency (e.g. 12 462 – 2 300 = 10 162).

NUMBER: Multiplication and Division

- Pupils practise and extend their use of the formal written methods of short multiplication and short division (see Appendix 1). They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.
- They use and understand the terms factor, multiple and prime, square and cube numbers.
- Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (e.g. $98 \div 4 = 24$ r $2 = 24\frac{1}{2} = 24.5 \approx 25$).
- Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.
- Distributivity can be expressed as $a(b + c) = ab + ac$ in preparation for using algebra.

NUMBER: Fractions (including decimals and percentages)

- Pupils should be taught throughout that percentages, decimals and fractions are different ways of expressing proportions.
- They extend their knowledge of fractions to thousandths and connect to decimals and measures.
- Pupils connect equivalent fractions > 1 that simplify to integers with division and fractions > 1 to division with remainders, using the
- number line and other models, and hence move from these to improper and mixed fractions.
- Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years. This relates to scaling by simple fractions, including fractions > 1.

- Pupils practise adding and subtracting fractions to become fluent through a variety of increasingly complex problems. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number.
- Pupils read and write proper fractions and mixed numbers accurately and continue to practise counting forwards and backwards in simple fractions.
- Pupils continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities, writing remainders as a fraction.
- Pupils extend counting from year 4, using decimals and fractions including bridging zero, for example on a number line.
- Pupils say, read and write decimal fractions and related tenths, hundredths and thousandths accurately and are confident in checking the reasonableness of their answers to problems.
- They mentally add and subtract tenths, and one-digit whole numbers and tenths.
- They practise adding and subtracting decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1 (e.g. 0.83 + 0.17 = 1).
- Pupils should go beyond the measurement and money models of decimals, for example by solving puzzles involving decimals.
- Pupils should make connections between percentages, fractions and decimals (e.g. 100% represents a whole quantity and 1% is 1/100, 50% is 50/100, 25% is 25/100) and relate this to finding 'fractions of'. They recognise that percentages are proportions of quantities as well as operators on quantities.

MEASUREMENT
- Pupils use their knowledge of place value and multiplication and division to convert between standard units.
- Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically 4 + 2b = 20 for a rectangle of sides 2 cm and b cm and perimeter of 20cm.
- They calculate the area from scale drawings using given measurements.
- Pupils use all four operations in problems involving time and money, including conversions (e.g. days to weeks, leaving the answer as weeks and days).

GEOMETRY: Properties of Shape
- Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor. They use conventional markings for parallel lines and right angles.
- Pupils use the term diagonal and make conjectures about the angles formed by diagonals and sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools.
- Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems.

GEOMETRY: Position and Direction
- Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.

STATISTICS
- Pupils connect their work on coordinates and scales to their interpretation of time graphs.
- They begin to decide which representations of data are most appropriate and why.

Objectives for Year 6

NUMBER: Number and Place Value						
	1	2	3	4	5	6
To read, write, order and compare numbers to at least 10,000,000 and determine the value of each digit						
To round any whole number to a required degree of accuracy						
To use negative numbers in context, and calculate intervals across zero						
To solve number and practical problems to that involve all of the above						

NUMBER: Addition, Subtraction, Multiplication and Division						
	1	2	3	4	5	6
To multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication						
To 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						
To perform mental calculations, including with mixed operations and large numbers						
To identify common factors, common multiples and prime numbers						
To use their knowledge of the order of operations to carry out calculations involving the four operations						
To solve problems involving addition, subtraction, multiplication and division						
To use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy						

NUMBER: Fractions (including decimals and percentages)						
	1	2	3	4	5	6
To use common factors to simplify fractions; use common multiplies to express fractions in the same denomination						
To compare and order fractions, including fractions > 1						
To add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions						

	1	2	3	4	5	6
To multiply simple pairs of proper fractions, writing the answer in its simplest form (e.g. ¼ x ½ = 1/8)						
To divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6)						
To associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)						
To 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						
To multiply one-digit numbers with up to two decimal places by whole numbers						
To use written division methods in cases where the answer has up to two decimal places						
To solve problems which require answers to be rounded to specified degrees of accuracy						
To recall and use equivalences between simple fractions, decimals and percentages, including in different contexts						

NUMBER: Ratio and Proportion						
	1	2	3	4	5	6
To solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts						
To solve problems involving the calculation of percentages (e.g. of measures) such as 15% of 360 and the use of percentages for comparison						
To solve problems involving similar shapes where the scale factor is known or can be found						
To solve problems involving unequal sharing and grouping using knowledge of fractions and multiples						

NUMBER: Algebra						
	1	2	3	4	5	6
To express missing number problems algebraically						
To use simple formulae expressed in words						
To generate and describe linear number sequences						
To find pairs of numbers that satisfy number sentences involving two unknowns						
To enumerate all possibilities of combinations of two variables						

MEASUREMENT						
	1	2	3	4	5	6
To solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate						
To use, read, write and convert between standard units, converting measurements of length, mass, volume andtime from a smaller unit of						

	1	2	3	4	5	6
measure to a larger unit, and vice versa, using decimal notation to up to three decimal places						
To convert between miles and kilometres						
To recognise that shapes with the same areas can have different perimeters and vice versa						
To recognise when it is possible to use formulae for area and volume of shapes						
To calculate the area of parallelograms and triangles						
To calculate, estimate and compare volume of cubes and cuboids using standard units, including centimetre cubed (cm³) and cubic metres (m³), and extending to other units such as mm³ and km³						

GEOMETRY: Properties of Shapes						
	1	2	3	4	5	6
To draw 2D shapes using given dimensions and angles						
To recognise, describe and build simple 3D shapes, including making nets						
To compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons						
To illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius						
To 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						
	1	2	3	4	5	6
To describe positions on the full coordinate gird (all four quadrants)						
To draw and translate simple shapes on the coordinate plane, and reflect them in the axes						

STATISTICS						
	1	2	3	4	5	6
To interpret and construct pie charts and line graphs and use these to solve problems						
To calculate and interpret the mean as an average						

Year 6 Notes and Guidance (non-statutory)

NUMBER: Number and Place Value
• Pupils use the whole number system, including saying, reading and writing numbers accurately.

NUMBER: Addition, Subtraction, Multiplication and Division
• Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Appendix 1). • They undertake mental calculations with increasingly large numbers and more complex calculations. • Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency. • Pupils round answers to a specified degree of accuracy, e.g. to the nearest 10, 20, 50 etc, but not to a specified number of significant figures. • Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. • Common factors can be related to finding equivalent fractions.

NUMBER: Fractions (including decimals and percentages)
• Pupils should practise, use and understand the addition and subtraction of fractions with different denominators by identifying equivalent fractions with the same denominator. They should start with fractions where the denominator of one fraction is a multiple of the other (e.g. $\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$) and progress to varied and increasingly complex problems. • Pupils should use a variety of images to support their understanding of multiplication with fractions. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle. • Pupils use their understanding of the relationship between unit fractions and division to work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (e.g. if $\frac{1}{4}$ of a length is 36cm, then the whole length is 36 × 4 = 144cm). • They practise with simple fractions and decimal fraction equivalents to aid fluency, including listing equivalent fractions to identify fractions with common denominators. • Pupils can explore and make conjectures about converting a simple fraction to a decimal fraction (e.g. 3 ÷ 8 = 0.375). For simple fractions with recurring decimal equivalents, pupils learn about rounding the decimal to three decimal places, or other appropriate approximations depending on the context. Pupils multiply and divide numbers with up to two decimal places by one-digit and two-digit whole numbers. Pupils multiply decimals by whole numbers, starting with the simplest cases, such as 0.4 × 2 = 0.8, and in practical contexts, such as measures and money. • Pupils are introduced to the division of decimal numbers by one-digit whole numbers and, initially, in practical contexts involving measures and money. They recognise division calculations as the inverse of multiplication.

- Pupils also develop their skills of rounding and estimating as a means of predicting and checking the order of magnitude of their answers to decimal calculations. This includes rounding answers to a specified degree of accuracy and checking the reasonableness of their answers.

NUMBER: Ratio and Proportion
- Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (e.g. similar shapes, recipes).
- Pupils link percentages or 360° to calculating angles of pie charts.
- Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work.
- Pupils solve problems involving unequal quantities e.g. 'for every egg you need three spoonfuls of flour', $^3/_5$ of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion.

NUMBER: Algebra
Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as:
- missing numbers, lengths, coordinates and angles
- formulae in mathematics and science
- arithmetical rules (e.g. $a + b = b + a$)
- generalisations of number patterns
- number puzzles (e.g. what two numbers can add up to).

MEASUREMENT
- They connect conversion (e.g. from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs.
- They know approximate conversions and are able to tell if an answer is sensible.
- Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature.
- They relate the area of rectangles to parallelograms and triangles, e.g. by dissection, and calculate their areas, understanding and using the formulae to do this.
- Pupils could be introduced to compound units for speed, such as miles per hour, and apply their knowledge in science or other subjects as appropriate.

GEOMETRY: Properties of Shape
- Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.
- Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements.
- These relationships might be expressed algebraically e.g. $d = 2 \times r$; $a = 180 - (b + c)$.

GEOMETRY: Position and Direction
- Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers.
- Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically e.g. translating vertex (a, b) to $(a-2, b+3)$; (a, b) and $(a+d, b+d)$ being opposite vertices of a square.

STATISTICS
• Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. • Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. • They should connect conversion from kilometres to miles in measurement to its graphical representation. • Pupils know when it is appropriate to find the mean of a data set.