Maths

Intent

We believe that Mathematics is a creative and highly inter-connected discipline. It is essential to everyday life, critical to science, technology and engineering, and necessary in most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

Implementation

A daily mathematics lesson is taught (60 mins Mon- Thurs) throughout Years 1-6. Friday is a problem-solving or arithmetic morning where children practice a range of fundamental mathematical skills including place value, number bonds and times tables. Daily Maths challenges are set in years 1-6 (between 8.45-9am) which learn, rehearse and consolidate core skills. Mathematics skills are also applied in other areas of the curriculum where appropriate.

Pupils work within their year groups and are set appropriate objectives according to their ability. The expectation is that the majority of pupils will move through the year group objectives at broadly the same pace. However, pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems; and those who are not sufficiently fluent with earlier objectives should consolidate their understanding, before moving on. Teachers follow the Calculations policy to ensure consistency and progression in their approach to teaching calculations and to build on children's previous knowledge.

Teachers all work from a long-term planning grid taken from the school's Maths Curriculum document, which is in line with White Rose Maths. The Maths co-ordinator is responsible for regularly reviewing these plans to ensure the correct coverage of the areas of study. Year 6 follow a carefully planned revision program tailored to their specific cohort's needs.

The emphasis is to develop a sequence of teaching and learning that encompasses the cycle of assess, plan, teach, practice, apply and review throughout each term. A strong emphasis is placed on the application of mathematical skills and problem solving within each unit of work. At the end of a unit of work, there is an end of unit assessment to complete, which helps to monitor progress; check understanding and inform our future planning of the topic. We also complete weekly arithmetic and times tables assessments, which inform our planning and teaching. At the end of each term, we upload our teacher assessments onto our online tracking system.

Our progression maps give an overview of the whole primary phase. They show the teacher what the children are expected to learn in that year group, but also gives them an understanding of what the previous learning was and how the learning will continue in the following year groups. Our medium-term plans, which we base on the New National Curriculum, gives details of the main teaching objectives for each year group or level. These plans define what we teach and ensure an appropriate balance and distribution of work across the year.

Class teachers use the White Rose Maths scheme of learning to plan their daily lessons to ensure a systematic and sequenced approach. At Cranberry, we use a range of

resources to enhance our Mathematics teaching including: White Rose Premium, Third Space Learning, NCETM, Classroom Secrets, Twinkl and Testbase.

Impact

The impact and measure of this is to ensure that children at Cranberry are equipped with skills and knowledge that will enable them to be ready for the Mathematics curriculum at Key Stage 3 and for life as an adult in the wider world. We want to equip our pupils with Mathematical skills such as: problem solving, analysis, data handling and communication skills, which are transferrable and often vital to any future job.

Assessment

Teachers assess children's work in Mathematics in three phases.

- In Years 1-6, each class teacher keeps an assessment grid on Showbie with the key objectives on, where teachers follow the school's marking system to show whether the child is secure in that skill.

- The short-term assessments that teachers make as part of every lesson, including effectively questioning, help them to adjust their daily plans. They match these short-term assessments closely to the teaching objectives. Written or verbal feedback is given to help guide children's progress or to ensure they know their next steps for learning. Children are encouraged to make daily improvements to their own work in their 'Response to marking' time or complete a challenge task to move their learning on.

- Teachers use 'White Rose' assessment tests to measure progress against the key objectives of the new national curriculum, and to help them plan for the next unit of work or address misconceptions later.

- Teachers make long-term assessments towards the end of the school year, and they use these to assess progress against school and national targets. With the help of these long-term assessments, they can set targets for the next academic year, and summarise the progress of each child before discussing it with the child's parents or carers. The next teacher then uses these long-term assessments as the planning basis for the new school year.

- These long-term assessments are based on a combination of end-of-block and end- of-year tests and teacher assessments. Children undertake the national tests at the end of Year 2 and Year 6 and children in Years 3, 4, and 5 complete optional SATs papers, which teachers use to assess progress against school and national targets. Year 4 complete the Multiplication check.

- There is a focus in each year group on embedding key arithmetic and times table skills with speed and accuracy, Teachers keep copies of these assessments to ensure pupils can make connections; retain knowledge and can build on core concepts;

- We target individual needs by pre-teaching lessons or delivering focused intervention work to pupils who are not sufficiently fluent with objectives;

- The subject leader keeps samples of children's work. This demonstrates what the expected level of achievement is in Mathematics in each year of the school. All staff attend maths moderation courses to ensure consistency across the school and between schools in Mathematics assessments.

- Staff are keen to improve their subject knowledge and the subject leader takes an active role in disseminating best practise and making recommendations for staff development.

Progression Map

End of EYFS	
Number	Children at the expected level of development will: Have a deep understanding of number to 10, including the composition of each number; Subitise (recognise quantities without counting) up to 5; Automatically recall (without reference to rhymes, counting or other aids) of number bonds up to 5 (including subtraction facts); Automatically recall of some number bonds to 10, including double facts.
Numerical Pattern	Children at the expected level of development will: Verbally count beyond 20, recognising the pattern of the counting system; Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity; Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.
Other	Practitioners will still be required to teach children about shape, space and measures, as part of a well-rounded curriculum, as set out in the revised mathematics educational programme.

Number

Number and place value
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 multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using 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 numerals and words.

Addition and subtraction
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 facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = - 9$.

Multiplication and division
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.

Fractions
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.

Measurement:

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.

Geometry

Properties of shape
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].

Position and direction
Pupils should be taught to:
- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Year 2 Maths National Curriculum Expectations

Number

Number and place value
Pupils should be taught to:
- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and 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.

Addition and subtraction
Pupils should be taught to:
- solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- 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.

Multiplication and division
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.

Fractions
Pupils should be taught to:
- recognise, find, name and write fractions 1/3, 1/4, 2/4 and ¾ of a length, shape, set of objects or quantity
- write simple fractions for example ½ of 6 = 3, and recognise the equivalence of 2/4 and 1/2.

Measurement:

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 =
- 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
- 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
- know the number of minutes in an hour and the number of hours in a day.

Geometry

Properties of shape
Pupils should be taught to:
- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects.

Position and direction
Pupils should be taught to:
- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).

Statistics

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 comparing categorical data.

Year 3 Maths National Curriculum Expectations

Number

Number and place value
Pupils should be taught to:
- count from 0 in multiples of 4, 8, 50 and 100; find 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 up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.

Addition and subtraction
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 formal 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.

Multiplication and division
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 formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Fractions
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 (for example, 5/7 + 1/7 = 6/7)
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

Measurement:

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 and hours; use vocabulary such as o'clock, 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].

Geometry

Properties of shape
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
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Statistics

Pupils should be taught to:
- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

Year 4 Maths National Curriculum Expectations

Number

Number and place value
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 know that over time, the numeral system changed to include the concept of zero and place value.

Addition and subtraction
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.

Multiplication and division
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 commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Fractions (including decimals)
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 one 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
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to , ,
- 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
- 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.

Measurement:

Pupils should be taught to:
- Convert between different units of measure [for example, 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 squares
- 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.

Geometry

Properties of shape
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.

Position and direction
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.

Statistics

Pupils should be taught to:
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Number

Number and place value

Pupils should be taught to:

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- 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
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Addition and subtraction

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.

Multiplication and division

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 and cubed
- 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.

Fractions (including decimals and percentages)

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 and write mathematical statements > 1 as a mixed number [for example, 2/5 + 4/5 = 6/5 = 1 1/5]
- 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
- read and write decimal numbers as fractions [for example, 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
- 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 ½ , ¼ ,1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25.

Measurement:

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.

Geometry

Properties of shape

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 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.

Position and direction

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.

Statistics

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.

Year 6 Maths National Curriculum Expectations

Number

Number and place value
Pupils should be taught to:
- read, write, order and compare numbers up to 10 000 000 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.

Addition, subtraction, multiplication and division
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.

Fractions (including decimals and percentages)
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 ¼ × ½ = 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.

Ratio and proportion

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 knowledge of fractions and multiples.

Algebra

Pupils should be taught to:
- 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.

Measurement

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].

Geometry

Properties of shape
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 is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

Position and direction
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.

Statistics

Pupils should be taught to:
- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average.

Nursery – Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Starters: Number songs	Colours • Red • Blue • Yellow	Colours • Green • Purple • Mix of colours	Match • Buttons and colours • Matching towers • Matching shoes	Match • Match number shapes • Match shapes • Pattern handprints – big and small	Sort • Colour • Size • Shape	Sort • What do you notice? • Guess the rule • Guess the rule	Number 1 • Subitising • Counting • Numeral	**Number 2** Subitising-dice pattern Subitising-random pattern Subitising – different sizes	**Number 2** • Counting • Numeral • Numeral	**Pattern** • Extend AB Colour patterns • Extend AB Outdoor Patterns • AB Movement Patterns	• Fix my Pattern • Extend ABC Colour patterns • Extend ABC Outdoor Patterns	Consolidation Activities - Winter activity week
Spring Starters: Number songs	Number 3 Subitising Subitising Subitising	Number 3 3 Little pigs 1:1 counting Numerals/Triangles	Number 4 1:1 counting Numerals Squares/rectangles	Number 4 Composition of 4 Composition of 4 Composition of 4	Number 5 1:1 counting Numerals Pentagon	Number 5 Composition of 5 Composition of 5 Composition of 5	Consolidate 1 - 5	Number 6 Introduce 10 frame	Height & Length • Tall and short • Long and short • Tall/long and short	Mass Relate to books 3 little pigs goldilocks	Capacity	Consolidation
Summer Starters – subitising and revision	Sequencing	Positional Language	More than/fewer than	Shape – 2D Revisit pattern from Autumn	Shape – 3D Revisit pattern from Autumn	Consolidation: More than/fewer one more and one less	Number composition 1 – 5 Revision	What comes after?	What comes before?	Numbers to 5	Consolidation / Activity weeks SUMMER	Consolidation / Activity weeks

Reception – Long Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Getting to know you		Match, sort and compare FREE TRIAL — VIEW		Talk about measure and patterns — VIEW		It's me 1, 2, 3 — VIEW		Circles and triangles — VIEW	1, 2, 3, 4, 5 — VIEW		Shapes with 4 sides — VIEW
Spring term	Alive in 5 — VIEW		Mass and capacity — VIEW	Growing 6, 7, 8 — VIEW		Length, height and time — VIEW		Building 9 and 10 — VIEW			Explore 3-D shapes — VIEW	
Summer term	To 20 and beyond — VIEW		How many now? — VIEW	Manipulate, compose and decompose — VIEW		Sharing and grouping — VIEW		Visualise, build and map — VIEW			Make connections — VIEW	Consolidation

Activ
Go to

Maths Year One Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number — Place value (within 10)					Number — Addition and subtraction (within 10)					Geometry Shape	Consolidation
Spring	Number — Place value (within 20)			Number — Addition and subtraction (within 20)			Number — Place value (within 50)		Measurement — Length and height		Measurement — Mass and volume	
Summer	Number — Multiplication and division			Number — Fractions		Geometry — Position and direction	Number — Place value (within 100)		Measurement Money	Measurement — Time		Consolidation

Maths Year Two Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**				Number **Addition and subtraction**					Geometry **Shape**		
Spring	Measurement **Money**	Number **Multiplication and division**						Measurement **Length and height**		Measurement **Mass, capacity and temperature**		
Summer	**Statistics**	Number **Fractions**			Geometry **Position and direction**			Problem solving		Measurement **Time**		

Math Year Three Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**					Number **Multiplication and division A**			
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**			Number **Fractions A**			Measurement **Mass and capacity**		
Summer	Number **Fractions B**		Measurement **Money**		Measurement **Time**			Geometry **Shape**		Statistics		Consolidation

Maths Year Four Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**				Number **Addition and subtraction**			Measurement **Area**	Number **Multiplication and division A**			Consolidation
Spring	Number **Multiplication and division B**			Measurement **Length and perimeter**	Number **Fractions**				Number **Decimals A**			
Summer	Number **Decimals B**		Measurement **Money**		Measurement **Time**		Consolidation	Geometry **Shape**		Statistics	Geometry **Position and direction**	

Maths Year Five Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**			Number **Addition and subtraction**		Number **Multiplication and division A**			Number **Fractions A**			
Spring	Number **Multiplication and division B**			Number **Fractions B**		Number **Decimals and percentages**			Measurement **Perimeter and area**		**Statistics**	
Summer	Geometry **Shape**			Geometry **Position and direction**		Number **Decimals**			Number **Negative numbers**	Measurement **Converting units**		Measurement **Volume**

Maths Year 6 Long-Term Plan

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number **Place value**		Number **Addition, subtraction, multiplication and division**					Number **Fractions A**		Number **Fractions B**		Measurement **Converting units**
Spring	**Ratio**		**Algebra**		Number **Decimals**		Number **Fractions, decimals and percentages**		Measurement **Area, perimeter and volume**		**Statistics**	
Summer	Geometry **Shape**			Geometry **Position and direction**	Themed projects, consolidation and problem solving							

Maths Calculation Policy

Addition

Concrete

Counting using counters, objects & Numicon:

4 + 2 = 6

5 + 1 = 6

Counting on:

4 + 3 = 7

Number stories:

2 + 3 = 5

Number bonds to 10:

5+5   6+4   7+3   8+2   9+1

Resources:
- Counters
- 100 grids
- Cuisenere rods
- 12x12 grids
- Locks & Keys
- Multilink cubes
- Numicon & resources
- Fake money & fans
- Place value cards
- Place value counters
- Number lines
- Counting objects

Pictorial

Counting on with 100 square:

Number lines:

35 + 23 = 58

Bar Modelling:

6 + 4 = 10

Part + part = whole

| 6 | 4 |

Abstract

Column addition:

```
  35
  23+
  58
```

Column addition (up to 4 digits):

```
  7465
+  827
  8292
```

Add amounts of money:

```
 £5.75
+£2.57
 £8.32
```

Exchange below, cross out once added.

Column addition more than 4 digits:

```
 12,608
+ 8,833
 21,441
```

Exchange below, cross out once added.

Column addition, decimals up to 3 decimal points:

```
 15.31
+ 7.924
 23.234
```

Subtraction

Concrete

Using counters, objects & Numicon:

8 − 3 = 5

Beads: 13 − 5 = 8

Numicon (covering):

Number stories:

5 − 3 = 2

Counting back on a number line:

10 − 4 = 6

Resources:
- Counters
- 100 grids
- Cuisenere rods
- 12x12 grids
- Locks & Keys
- Multilink cubes
- Numicon & resources
- Fake money & fans
- Place value cards
- Place value counters
- Number lines
- Counting objects

Pictorial

Counting back / on with 100 square:

Counting back using a number line:

82 − 34 = 48

Counting on using a number line:

31 − 17 = 14

Bar Modelling:

8 − 3 = 5

| 3 | ? |

Whole- part = part

Abstract

Column subtraction:

```
  27
− 14
  13
```

Column subtraction (up to 4 digits)

```
  4942
−  634
  4308
```

Exchange above

Subtract amounts of money:

```
 £7.50
−£1.95
 £5.55
```

Column subtraction more than 4 digits:

```
 39,461
− 5,633
 33,828
```

Column subtraction, decimals up to 3 decimal points:

15.67 − 4.924 = 10.746

```
 15.670
− 4.924
 10.746
```

Add in a zero to reinforce place value.

Multiplication

Resources:
- Counters
- 100 grids
- Cuisenaire rods
- 12x12 grids
- Locks & Keys
- Multilink cubes
- Numicon & resources
- Fake money & tens
- Place value cards
- Place value counters
- Number lines
- Counting objects

Concrete

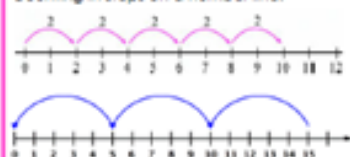Counting in steps on hands:

Using counters, objects and Numicon: 4 x 10 = 40
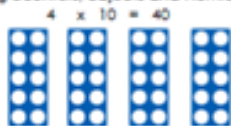
Repeated addition of objects & Numicon: 4 x 3 = 12

3 3 3 3

Pictorial

Counting in steps on a number line:

Showing an array: 8 x 4 = 32

Bar Modelling: 4 x 6 = 24

4 4 4 4 4 4

Abstract

Repeated addition: 5 x 2 = 10 → 2 + 2 + 2 + 2 + 2 = 10

Column method – short multiplication:

2 digit multiplied by a single digit:

$$\begin{array}{r} 39 \\ \times \quad 4 \\ \hline 156 \end{array}$$

Exchange tens below and cross out once added to avoid confusion.

3 digit multiplied by a single digit:

$$\begin{array}{r} 254 \\ \times \quad 3 \\ \hline 762 \end{array}$$

Column method – long multiplication:

3 digit multiplied by a 2 digit:

$$\begin{array}{r} 547 \\ \times \quad 23 \\ \hline 1641 \\ + 10940 \\ \hline 12581 \end{array}$$

Exchange tens below and cross out once added to avoid confusion. Continue to exchange below for adding.

One digit number up to 2 decimal places by a whole number

$$\begin{array}{r} 1.25 \\ \times \quad 7 \\ \hline 8.75 \end{array}$$

Decimal No. set out at the top to allow for short multiplication method.

Decimal point in answer needs to align with the decimal point in the calculation.

Division

Resources:
- Counters
- 100 grids
- Cuisenaire rods
- 12x12 grids
- Locks & Keys
- Multilink cubes
- Numicon & resources
- Fake money & tens
- Place value cards
- Place value counters
- Number lines
- Counting objects

Concrete

Sharing using counters, objects & Numicon:
e.g. 10 shared between 2

Halving of shapes:

Using objects representations, problems in context: e.g. 16 ÷ 4
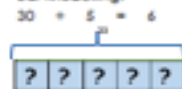
Pictorial

Pictorial representation in context: 8 ÷ 2 = 4

Bar Modelling: 30 ÷ 5 = 6

? ? ? ? ?

Abstract

Written methods of short division:

98 ÷ 7 becomes

$$\begin{array}{r} 1 \ 4 \\ 7 \overline{\smash{)}9 \ ^2 8} \end{array}$$

Remainders are added to the top left hand side of the next column (exchanged). Remainders at the end of the calculation are show by the letter 'r'.

432 ÷ 5 becomes

$$5 \overline{\smash{)}4 \ ^4 3 \ ^3 2} = 8 \ 6 \ r \ 2$$

Short division used as above, if the answer is required to be written as a fraction:

496 ÷ 11 becomes

$$11 \overline{\smash{)}4 \ 9 \ ^5 6} = 4 \ 5 \ r \ 1$$

Answer: 45 $\frac{1}{11}$

The remainder is the numerator, the denominator is the number being divided by.

Long division using times tables:

15	90
30	105
45	120
60	135
75	150

$$15 \overline{\smash{)}4 \ ^4 3 \ ^{13} 2} = 0 \ 2 \ 8 \ r \ 12$$

Answering as a decimal:

$$6 \overline{\smash{)}2 \ ^2 0 \ 7 \ . \ ^3 0} = 0 \ 3 \ 4 \ . \ 5$$

Short division as usual, remainders are exchanged into the next column and a zero is added to hold the place when moving into the decimal columns.

We can also solve division by skip counting on a number line.

12 ÷ 3 = 4

Vocabulary Map

Number - Number and place value						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
count	sort	count in steps	ascending	negative numbers	ten thousands	millions
subitise	represent	count in multiples	descending	roman numerals	one hundred thousands	ten millions
order/ordinal	multiples	place value	10 or 100 more	1000 more	powers of	
compare	partitioning	estimate	10 or 100 less	1000 less	integer	
forwards	ones	compare	hundreds	thousands		
backwards	tens			round		
numerals						
digit						
one more						
one less						
equal to						
more than						
less than (fewer)						

Addition and subtraction						
Reception	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**
add	addition/add	sum	column addition	4-digit number		
plus	subtraction	3-digit number	column subtraction	operations		
altogether	difference	commutative	exchange	methods		
total	equals		estimate			
take away /minus	facts					
number bonds	problems					
part	missing number problems					
whole	2-digit number					
digit	inverse					

Multiplication and division

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
double	multiplication	multiplication tables	exchange	factor pairs	multiples	multi-digit numbers
half	division	commutative	mathematical statements	formal written layout	factors	long division
twice as many	arrays	repeated addition	missing number problems	distributive law	prime numbers	
equal			integer scaling problems	remainders	square numbers	
unequal			correspondence problems		cube numbers	
share			derived facts		short division	
group					product	
odd					dividend	
even					divisor	
					quotient	
					operations	

Fractions/Decimals/Percentages

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	whole	three quarters	tenths	decimal equivalence	fifth	
	half	third		hundredths	thousandths	
	quarter	equivalent fractions		convert	mixed numbers	
	equal parts	unit fractions		proper fractions	per cent %	
		non unit fractions		improper fractions	factors	
		numerator		decimal point	integer	
		denominator			complements	
		one whole				

Ratio and proportion						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						relative size
						missing values
						integer multiplication
						percentages
						scale factor
						unequal sharing & grouping

Algebra						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
						formulae
						linear number sequences
						algebraically
						equation
						unknowns
						combinations
						variables