*'Mathematics is, in its way, the poetry of logical ideas'* - Albert Einstein

# Curriculum Learning Guide Mathematics

How is mathematics taught at Low Ash?

| Curriculum Intent |
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At Low Ash Primary School, we aim that every pupil will be provided with the tools to develop into confident and successful mathematicians who have a thorough knowledge and understanding of the fundamentals of mathematics and can apply these independently in reasoning and problem solving including across the curriculum. We aim for our pupils to gain:

- Procedural fluency: knowing *how* to do mathematics
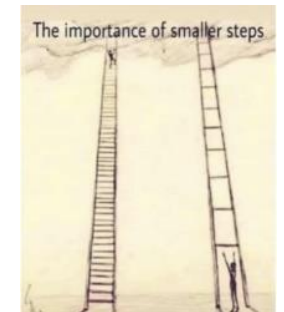- Conceptual fluency: knowing *why* mathematics works

They can then build on this firm foundation to reason and solve problems.

At Low Ash we aim to dispel the myth that mathematics is an inherent skill known only to a few. We believe our curriculum facilitates every pupil, regardless of ability, to enjoy mathematics, appreciate the magic of mathematics and feel empowered to succeed.

| Implementation |
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At Low Ash Primary we have adopted a mastery approach to the teaching of mathematics having worked successfully for a number of years with the West Yorkshire Maths Hub.


The importance of smaller steps

- **Small steps –** At Low Ash we believe in the importance of small steps to ensure a deeply embedded curriculum which is accessible to all. We use the White Rose Maths and NCETM small steps to guide our planning and teaching.

- **Concrete > Pictorial > Abstract** – At Low Ash, our curriculum design is underpinned by the idea that our pupils better understand mathematics if they are able to do and see the concepts before they can be expected to understand them abstractly. Every classroom has a range of manipulatives for use by pupils to aid their learning and they are exposed to a wide range of mathematical and real-life representations in their learning.

- **Fluency –** At Low Ash we understand that fluency of learnt mathematics facts is essential to lower the cognitive load and enable our pupils to further their mathematics knowledge. We follow a carefully thought out timetable of KIRFs (Key Instant Recall Facts) which are frequently practised in lessons, where teachers link these to previous knowledge and other aspects of maths to develop a deep understanding, and through home learning.

- **Explore –** At Low Ash we provide our pupils with a range of learning experiences to improve their reasoning and problem solving in maths. These include regular opportunities for open ended investigations; opportunities to describe, explain, convince, justify and prove their mathematics; hands-on investigations and applying their mathematics skills across the wider curriculum.

- **Feedback & Intervention –** Teachers and teaching assistants provide on the spot, immediate feedback in lessons where possible, either with individual pupils, groups or whole class. The pupils at Low Ash follow a simple and effective feedback code policy to assess and improve their work independently. Where interventions are needed, our teachers facilitate this the same or next day where at all possible.

- **Post Covid-19 Curriculum –** At Low Ash we continue to use AFL and low stakes assessment to ensure we are aware of the gaps in our pupils' mathematics learning as a result of the Covid- 19 pandemic and we continue to plan accordingly. Teachers will recap themes and topics as required as we move forward.

- **Inclusion –** Where possible all pupils will follow their year group's curriculum with added support, scaffolding, resources and even smaller steps where needed. Occasionally, some pupils may be working well below their year group's curriculum. Where this is the case, teachers will design their lessons to include these pupils

as much as possible using suitable questioning and encouraging independence by planning using the same or similar topics (e.g. place value) but from a preceding year group's programme of study.

- **Mathematics across the wider curriculum –** Teachers will identify and plan where mathematics can be incorporated into the wider curriculum. We, at Low Ash, believe it is essential for our pupils to understand these links and to appreciate the importance of mathematics in all facets of learning and in life.

- **Teacher knowledge –** At Low Ash, we believe it is crucial for our teachers and teaching assistants to not only have a secure subject knowledge of mathematics but to constantly re-evaluate their teaching, being aware of common misconceptions and how to address these and to use effective questioning to enable the pupils to show their depth of understanding. Teachers and teaching assistants have access to ongoing CPD.

- **Lesson structure –** We do not believe in a set, rigid lesson structure at Low Ash; instead, we trust our teachers to plan according to the needs of their pupils. However, there is an expectation that the vast majority of lessons will include:

  - Counting
  - Recapping/revising earlier learning  - yesterday, last week, last term
  - Fluency – declarative (Kirfs and practising known facts) and procedural (strategies)
  - Teacher and pupil modelling

| Impact |
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Empowering our pupils to believe themselves to be competent mathematicians; allowing them the opportunity to progress in their learning using small steps; ensuring multiple opportunities for practising fluency of mathematics facts; providing rigorous and challenging opportunities for deeper reasoning and mathematical understanding for all pupils; challenging pupils to make links across their maths learning and with other curriculum subjects and, above all, promoting a supportive and nurturing environment where mistakes are seen as a learning opportunity, will ensure our pupils leave Low Ash Primary School equipped with the skills and understanding needed and as competent, independent and confident mathematicians.

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **PV: Counting** | -Recite numbers past 5<br>-Say one number for each item in order: 1,2,3,4,5<br>-Know that the last number reached when counting a small set of objects tells you how many there are in total (cardinal principle) | -Count objects, actions and sounds<br>-Count beyond ten | -Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number<br>-Count numbers to 100 in numerals; count in multiples of 2,5, 10 | -Count in steps of 2,3 and 5 from 0, and in tens from any number, forward and backward | -Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more of less than a given number | -Count in multiples of 6,7,9,25 and 1000<br>-Count backwards through zero to include negative numbers | -Count forwards or backwards in steps of powers of 10 for any given number to to 1 million<br>-Count forwards and backwards with positive and negative whole numbers, including through zero | |
| **PV: Representing** | -Develop fast recognition of up to 3 objects, without having to count them individually (subitising)<br>-Show finger numbers up to 5<br>-Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5<br>-Experiment with their own symbols and marks as well an numerals | -Subitise<br>-Link the number symbol (numeral) with its cardinal number value<br>-Explore the composition of numbers to 10 | -Identify and represent numbers using objects and pictoral representations<br>-Read and write numbers to 100 in numerals<br>-Read and write numbers from 1 to 20 in numerals and words | -Read and write numbers to at least 100 in numerals and in words<br>-Identify, represent and estimate numbers using different representations, including the number line | -Identify, represent and estimate numbers using different representations<br>-Read and write numbers up to 1000 in numerals and in words | -Identify, represent and estimate numbers using different representations<br>-Read Roman numerals to 100 and know that over time the numeral system changed to include the concept of zero and place value | -Read, write, (order and compare) numbers to at least 1 million and determine the value of each digit<br>-Read Roman numerals to 1000 (M) and recognise years written in Roman numerals | -Read, write, (order and compare) numbers up to 10 million and determine the value of each digit |
| **PV: Using & comparing** | -Compare quantitites using language: 'more than', 'fewer than' | -Compare numbers<br>-Understand the 'one more than'/'one less than' relationship between consecutive numbers | -Given a number, identify one more and one less | -Recognise the place value of each digit in a 2-digit number<br>-Compare and order numbers from 0 up to 100; use <, > and = signs | -Recognise the place value of each digit in a three-digit number<br>-Compare and order numbers up to 1000 | -Find 1000 more or less than a given number<br>-Recognise the place value of each digit in a 4-digit number<br>-Order and compare numbers beyond 1000 | -(Read, write) order and compare numbers to at least 1 million and determine the value of each digit | -(Read, write), order and compare numbers up to 10 million and determine the value of each digit |

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **PV: Problems & rounding** | -Solve real world mathematical problems with numbers up to 5 | | | -Use place value and number facts to solve problems | -Solve number problems and practical problems involving these ideas | -Round any number to the nearest 10, 100 or 1000 -Solve number and practical problems that involve all of the above and with increasingly larger numbers | -Interpret negative numbers in context -Round any number up to 1 million to the nearest 10, 100, 1000, 10000 or 100000 -Solve number problems and practical problems that involve all of the above | -Round any whole number to a required degree of accuracy -Use negative numbers in context and calculate intervals across zero -Solve number and practical problems that involve all of the above |
| | **Nursery** | **Reception** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Addition & Subtraction: Recall, represent & use** | | -Automatically recall number bonds for numbers 0-5 and some to 10 | -Read, write and interpret mathematical statements involving addition, subtraction and equals signs -Represent and use number bonds and related subtraction facts within 20 | -Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 -Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot -Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems | -Estimate the answer to a calculation and use inverse operations to check answers | -Estimate and use inverse operations to check answers to a calculation | -Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy | |
| **Addition & Subtraction: Calculations** | | | -Add and subtract 1 and 2- digit numbers to 20 including zero | -Add and subtract numbers using concrete objects, pictoral representations, | -Add and subtract numbers mentally, including: *a 3-digit number and ones | -Add and subtract numbers with up to 4 digitis using the formal written methods of columnar addition | -Add and subtract whole numbers with more than 4 digitis, including using formal written methods | -Perform mental calculations, including with mixed operations and large numbers |

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | | | | and mentally, including:<br>*a 2-digit number and ones<br>*a 2-digit number and tens<br>*two 2-digit numbers<br>*adding three 1-digit numbers | *a 3-digit number and tens<br>*a 3-digit number and hundreds<br>-Add and subtract numbers with up to three digitis, using formal written methods of columnar addition and subtraction | and subtraction where appropriate | -Add and subtract numbers mentally with increasingly large numbers | -Use their knowledge of the order of operations to carry out calculations involving the four operations |
| **Addition & Subtraction: Solve problems** | | | -Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = * - 9 | -Solve problems with addition and subtraction;<br>*Using concrete objects and pictorial representations, including those involving numbers, quantities and measures<br>*apply their increasing knowledge of mental and written methods | -Solve problems including missing number problems, using number facts, place value, and more complex addition and subtraction | -Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why | -Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why<br>-Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign | -Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why |
| | **Nursery** | **Reception** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Multiplication & Division: Recall, represent and use** | | | | -Recall and use multiplication and divison facts for the 2,5 and 10 multipication tables, including recognising odd and even numbers<br>-Show that multiplication of two numbers can be done in any order (commutative) and division of | -Recall and use multiplication and division facts for the 3,4 and 8 multiplication tables | -Recall multiplication and division fatcs for multiplication tables up to 12x 12<br>-Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers | -Identify multiples and factors, including finding all factor pairs of a numbers and common factors of two numbers<br>-Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers<br>-Establish whether a number up to 100 | -Identify common factors, common multiples and prime numbers<br>-Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy |

| | | | | one number by another cannot | | -Recognise and use factor pairs and commutativity in mental calculations | is prime and recall prime numbers up to 19 | |
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| **Multiplication & Division: Calculations** | | | | -Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication, division and equals signs | -Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods | -Multiply 2-digit and 3-digit numbers by a 1-digit numbers using formal written layout | -Multiply numbers up to 4 digits by a 1-digit or 2-digit number using a formal written method, including long multiplication for 2-digit numbers<br>-Multiply and divide numbers mentally drawing upon known facts<br>-Divide numbers up to 4 digits by a 1-digit number using the formal written method of short division and interpret remainders appropriately for the context<br>-Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 | -Multiply nulti-digit numbers up to 4 sigits by a 2-digit whole number using the formal written method of long multiplication<br>-Divide numbers up to 4 digitis by a 2-digt 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<br>-Divide numbers up to 4 digits by a 2-digti number using the formal written method of short division where appropriate, interpreting remainders according to the context<br>-Perform mental calculations, including with mixed operations and large numbers |

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| **Multiplication & Division: Solve problems** | | | -Solve 1-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representation and arrays with the support of the teacher | -Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts | -Solve problems including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problesm in which n objects are connected to m objects | -Solve problems involving multiplying and adding, including using the distributive law to multiply 2-digit numbers by 1-digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects | -Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes | -Solve problems involving addition, subtraction, multiplication and division |
| **Multiplication & Division: Combined problems** | | | | | | | -Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding of the menaing of the equals sign | -Use their knowledge of the order of operations to carry out calculations involving the four operations |
| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| **Fractions: Recognise and write** | | | -Recognise, find and names a half as one of two equal parts of an object, shape or quantity -Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity | -Recognise, find, name and write fractions 1/3, ¼, 2/4, ¾ of a length, shape, set of objects or quantity | -Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing 1-digit numbers of 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 | -Count up and down in hundredths: recognise that hundredths arise when dividing an object by one hundred and dividing tenths by 10 | -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 | |

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| | | | | | fractions and non-unit fractions with small denominators | | + 4/5 = 6/5 = 1 1/5 | |
| **Fractions: Compare** | | | | -Recognise the equivalance of 2/4 and 1/2 | -Recognise and show using diagrams, equivalent fractions with small denominators -Compare and order unit fractions, and fractions with the same denominators | -Recognise and show, using diagrams, families of common equivalent fractions | -Compare and order fractions whose denominators are all multiples of the same number | -Use common factors to simplify fractions: use common multiples to express fractions in the same denomination -Compare and order fractions, including fractions >1 |
| **Fractions: Calculations** | | | | -Write simple fractions for example, ½ of 6 =3 | -Add and subtract fractions with the same denominator within one whole (for example 5/7 + 1/7 = 6/7) | -Add and subtract fractions with the same denominator | -Add and subtract fractions with the same denominator and denominators that are multiples of the same number -Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams | -Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions -Multiply simple pairs of proper fractions, writing the answer in its simplest form (for example ¼ x ½ = 1/8) -Divide proper fractions by whole numbers (for example, 1/3 ÷ 2 = 1/6) |
| **Fractions: Solve problems** | | | | | -Solve problems that involve all the above | -Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where | | |

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| | | | | | | | the answer is a whole number | |
| **Decimals: Recognise and write** | | | | | | | -Recognise and write decimal equivalents of any number of tenths or hundredths<br>-Recognise and write decimal equivalents to ¼, ½. ¾ | -Read and write decimal numbers (for example, 0.71 = 71/100<br>-Recognise and use thousandths and realte them to tenths, hundredths and decimal equivalents | -Identify the value of each digit in numbers given to three decimal places |
| **Decimals: Compare** | | | | | | | -Round decimals with one decimal place to the nearest whole number<br>-Compare numbers with the same number of decimal places up to two decimal places | -Round decimals with two decimal places to the nearest whole number and to one decimal place<br>-Read, write, order and compare numbers with up to three decimal places | |
| **Decimals: Calculations & problems** | | | | | | | -Find the effect of dividing a 1-digit or 2-digit number by 10 & 100<br>-Idenitifying the value of the digits in the answer as one, tenths and hundredths | -Solve problems involving numbers up to 3 decimal places | -Multiply and divide numbers by 10, 100 & 1000 giving answers up to 3 decimal places<br>-Multiply 1-digit numbers with up to 2 decimal places by whole numbers<br>-Use written division methods in cases where the answer has up to 2 decimal places<br>-Solve problems which require answers to be rounded to specified degrees of accuracy |

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| **F, D, P** | | | | | | -Solve simple measure and money problems involving fractions and decimals to 2 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 a denominator of 100 and as a decimal<br>-Solve problems which require knowing percentages and decimal equivalents of ½. ¼, 1/5, 2/5, 4/5 and those fractions with a denominators of a multiple of 10 or 25 | -Associate a fraction with division and calculate decimal fraction equivalents (for example 0.375) for a simple fraction (for example 3/8)<br>-Recall and use equivelences between simple fractions, decimals and percentages, including in different contexts |
| **Ratio & Proportion** | | | | | | | | -Solve problems involving the relative sizes of 2 quantities where missing values can be found by using integer multiplication and division facts<br>-Solve problems involving the calculation of percentages (for example of measures, and such as 15% of 360) and the use of percentages for comparison<br>-Solve problems involving similar shapes where the scale factor is |

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | | | | | | | | known or can be found<br>-Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples |
| **Algebra (+ sequencing in EYFS)** | -Talk about and identify the patterns around them, for examples stripes on clothes, designs on wallpaper. Use langaues such as 'blob', 'spotty', 'pointy'<br>-Extend and create ABAB patterns – stick, leaf, stick, leaf<br>-Notice and correct an error in a repeating pattern<br>-Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then' | -Continue, copy and create repeating patterns | -Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7= *-9 | -Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems | -Solve problems including missing number problems | | | -Use simple formulae<br>-Generate and describe linear number sequences<br>-Express missing number problems algebraically<br>-Find pairs of numbers that satisfy an equation with 2 unknowns<br>-Enumerate possibilities of combinations of 2 variables |
| | **Nursery** | **Reception** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **Measurement: Using measures** | -Make comparisons between objects relating to size, length, weight and capacity | -Compare length, weight and capacity | -Compare, describe and solve practical problems for:<br>*lengths and heights (for example long/short, longer/shorted, tall/short, double/half)<br>*mass/weight (for example, heavy/light, heavier than, lighter than) | -Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm), mass (kg/g), temperature (˚C), capacity (litres/ml) to the nearest appropriate unti, | -Measure, compare, add and subtract lengths (m,cm,mm), mass (kg/g), volume/capacity (l/ml) | -Convert between different units of measure (for example, km=m, hour=minute)<br>-Estimate, compare and calculate different measures | -Convert between different units of metric measure (for example, k=m, m=cm, cm=mm, g=kg, l=ml)<br>-Understand and use approximate equivalences between metric units and common imperial units such as | -Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate<br>-Use, read, write and convert between standard units, converting |

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| | | | *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) | using rulers, scales, thermometers and measuring vessels -Compare and order lengths, mass, volume/capacity and record the results using >, < and = | | | inches, pound and pints -Use all four operations to solve problems involving measure (for example length, mass, volume, money) using decimal notation, including scaling | measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation up to 3 d.p. -Convert between miles and km |
| **Measurement: Money** | | | -Recognise and know the value of different denominations of coins and notes | -Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value -Find different combinations of coins that equal the same amounts of money -Solve simple problems in a practical context involving addition and subtraction of money of the same unit including giving change | -Add and subtract amounts of money to give change, using both £ and p in practical contexts | -Estimate, compare and calculate different measures, including money in pounds and pence | -Use all four operations to solve problems involving measure (for example, money) | |
| **Measurement: Time** | | | -Sequence events in chronological order using language (e.g. before and after, next, first, today, yesterday, tomorrow, | -Compare and sequence intervals of time -Tell and write the time to five minutes, | -Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12 | -Read, write and convert time between analogue and digital 12- and 24- hour clocks | -Solve problems involving converting between units of time | -Use, read, write and convert between standard units, converting measurements of time from a |

| | | | | | hour and 24 hour clocks | -Solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days | | similar unit of measure to a larger unit, and vice versa |
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| | | | morning, afternoon and evening<br>-Recognise and use language relating to dates, including days of the week, weeks, months and years<br>-Tell the time to the hour and half past the hour and draw the hands on a clock faces to show these times | including quarter past/to the hour and draw the hands on a clock face to show these times<br>-Know the number of minutes in an hour and the number of hours in a day | -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, am/pm, morning afternoon, noon and midnight<br>-Know the number of seconds in a minute and the number of days in each month, year and leap year<br>-Compare durations of events (for example to calculate the time taken by particular events or tasks) | | | |
| **Measurement: Perimeter, area, volume** | | | | | -Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres<br>-Find the area of rectilinear shapes by counting squares | -Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres<br>-Find the area of rectilinear shapes by counting squares | -Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres<br>-Calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm²) ad square metres | -Recognise that shapes with the same areas can have different perimeters and vice versa<br>-Recognise when it is possible to use formulae for area and volume of shapes<br>-Calculate the area of parallelograms and triangles<br>-Calculate, estimate and |

| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| | | | | | | | (m²) and estimate the area of irregular shapes -Estimate volume (e.g. using 1cm³ vlocks to build cuboids (including cubes) and capacity (e.g. using water) | compare volume of cubes and cuboids using standard units, including cubic cubic centimetres (cm³) and cubic meteres (m³) and extending to other units (for example, mm³ and km³) |
| **Geometry: 2-D shapes** | -Talk about and explore 2D and 3D shapes (for example: circles, rectangles, triangles and cuboids) using informal and mathematical language: sides, corners, straight, flat, round -Select shapes appropriately: flat surfaces for building, a triangular prism for a roof etc - Combine shapes to make new ones – an arch, a bigger tirangle | -Select, rotate and manipulate shapes to develop spatial reasoning skills -Compose and decompose shapes so that children recognise a shape can have other shapes within it just as numbers can | -Recognise and name common 2-D shapes (e.g. rectangles (including squares), circles and triangles | -Identify and describe the properties of "D shapes, including the number of sides and line symmetry in a vertical line -Identify 2D shapes on the surface of £D shapes, (e.g. a circle on a cylinder and a triangle on a pyramid) -Compare and sort common 2D shapes and everyday objects | -Draw 2D shapes | -Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes -Identify lines of symmetry in "D shapes presented in different orientations | -Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. -Use the properties of rectangles to deduce related facts and find missing lengths and angles | -Draw 2D shapes using given dimensions and angles -Compare and classify geometric shapes based on their properties and sizes -Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius |
| **Geometry: 3-D shapes** | | | -Recognise and name common 3D shapes (e.g. cuboids (including cubes), pyramids and spheres) | -Recognise and name common 3D shapes (for example, cuboids (including cubes), pyramids and spheres) -Compare and sort common 3D shapes and everyday objects | -Make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them | | -Identify 3D shapes, including cubes and other cuboids, from 2D representations | -Recognise, describe and build simple 3D shapes, including making nets |

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| **Geometry: Angles and lines** | | | | , | -Recognise angles as a property of shape or a description of a turn<br>-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<br>-Identify horizontal and vertical lines and pairs of perpendicular and parallel lines | -Identify acute and obtuse angles and compare and order angles up to two right angles by size<br>-identify lines of symmetry in "D shapes presented in different orientations<br>-Complete a simple symmetric figure with respect to a specific line of symmetry | -Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles<br>-Draw given angles and measure them in degrees<br>-Identify:<br>*angles at a point and one whole turn (total 360 degrees)<br>*angles at a point on a straight line and ½ a turn (total 180 degrees)<br>*other multiples of 90 degrees | -Find unknown angles in any triangles; quadrilaterals, and regular polygons<br>-Recognise angles where they meet at a point, are on a straight, or are vertically opposite, and find missing angles |
| **Geometry: Position & direction** | -Understand position through words alone (for example: the bag is under the table) with no pointing<br>-Describe a familiar route<br>-Discuss routes and locations, using words like 'in front of' and 'behind' | | -Describe position, direction and movement, including whole, half, quarter and three-quarter turns | -Order and arrange combinations of mathematical objects in patterns and sequences<br>-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 | | -Describe positions on a 2-D grid as co-ordinates in the first quadrant<br>-Describe movements between positions as translations of a given unit to the left/right and up/down<br>-Plot specified points and draw sides to complete a given polygon | -Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed | -Describe positions on the full co-ordinate grid (all four quadrants)<br>-Draw and translate simple shapes on the co-ordinate plane, and reflect them in the axes |

| | | | | and anti-clockwise) | | | | |
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| | Nursery | Reception | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Statistics: Present & interpret | | | | -Interpret and construct simple pictograms, tally charts, block diagrams and simple tables | -Interpret and present data using bar charts, pictograms and tables | -Interpret and present discrete and continuous data using appropriate graphical methods including bar charts and time graphs | -Complete, read and interpret information in tables, including timetables | -Interpret and construct pie charts and line graphs and use these to solve problems |
| Statistics: Solve problems | | | | -Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity<br>-Ask and answer questions about totalling and comparing categorical data | -Solve one-step and two-step questions (e.g. 'How many more?' amd 'How many fewer?') using information presented in scaled bar charts and pictograms and tables | -Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs | -Solve comparison, sum and difference problems using information presented in a line graph | -Calculate and interpret the mean as an average |