Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Number and place value

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **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. | Pupils should be taught to:  count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward  recognise the place value of each digit in a two-digit number (tens, ones)  identify, represent and estimate numbers using different representations, including the number line  compare and order numbers from 0 up to 100; use <, > and = signs  read and write numbers to at least 100 in numerals and in words  use place value and number facts to solve problems. | Pupils should be taught to:  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. | 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. | 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 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. | 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. |

Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Addition and subtraction

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **Addition and subtraction**  **Year 6: Addition, subtraction, multiplication and division and algebra** | 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. | 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 missing number problems. | 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. | Pupils should be taught to:  add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate  estimate and use inverse operations to check answers to a calculation  solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why. | Pupils should be taught to:  add and subtract whole numbers with more than 4 digits,  including using formal written methods (columnar addition and subtraction)  add and subtract numbers mentally with increasingly large numbers  use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy  solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. | Pupils should be taught to:  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  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, levels of accuracy.  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 number sentences involving two unknowns  enumerate all possibilities of combinations of two variables. |

Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Multiplication and division

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **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. | Pupils should be taught to:  recall and use multiplication and division facts for the 2, 5  and 10 multiplication tables, including recognising odd and even numbers  calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs  show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot  solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts. | Pupils should be taught to:  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 integer scaling problems and correspondence problems in which n objects are connected to m objects. | 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. | Pupils should be taught to:  identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers.  know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers  establish whether a number up to 100 is prime and recall prime numbers up to 19  multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers  multiply and divide numbers mentally drawing upon known facts  divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context  multiply and divide whole numbers and those involving decimals by 10, 100 and 1000  recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)   * Solve problems involving   multiplication and division and a combination of these, inc understanding the meaning of the equals sign  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. | [See information in above table; **Addition and Subtraction]** |

Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Fractions ◆ Decimals ◆ Percentages ◆ Ratio and proportion ◆ Algebra

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **Fractions**  **Year 6: Fractions (including decimals and percentages)**  **Also includes ratio and proportion criteria** | Pupils should be taught to:  recognise, find and name a half as one of two equal parts of an object, shape or quantity  recognise, find and name a quarter as one of four equal parts of an object, shape or quantity. | Pupils should be taught to:  recognise, find, name and write fractions 1/3, 1/4, 2/4 and 3/4 of a length, shape, set of objects or quantity  write simple fractions e.g. 1/2 of 6 = 3 and recognise the equivalence of 2/4 and 1/2. | Pupils should be taught to:  count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10  recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators  recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators  recognise and show, using diagrams, equivalent fractions with small denominators  add and subtract fractions with the same denominator within one whole (e.g. 5/7 + 1/7 = 6/7)  c  ompare and order unit fractions, and fractions with the same denominators  solve problems that involve all of the above. | Pupils should be taught to:  recognise and show, using diagrams, families of common equivalent fractions  count up and down in hundredths; recognise that hundredths arise when dividing an object by a hundred and dividing tenths by ten.  solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number  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 1/4; 1/2; 3/4  find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as 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. | 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 (e.g. 2/5 + 4/5 = 6/5 = 11/5)  add and subtract fractions with the same denominator and 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 (e.g. 0.71 = 71/100)  recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents  round decimals with two decimal places to the nearest whole number and to one decimal place  read, write, order and compare numbers with up to three decimal places  solve problems involving number up to three decimal places  recognise the per cent symbol (%) and understand that per cent relates to “number of parts per hundred”, and write percentages as a fraction with denominator hundred, and as a decimal fraction  solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25. | Pupils should be taught to:  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 (e.g. 1/4 × 1/2 = 1/8)  divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6 )  associate a fraction with division and calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8)  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  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 (e.g. of measures) 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. |

Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Measurement

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **Measurement** | Pupils should be taught 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 (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 such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening   recognise and use language relating to dates, including days of the week, weeks, months and years   tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. | Pupils should be taught to:  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 | Pupils should be taught to:  measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)  measure the perimeter of simple 2-D shapes  add and subtract amounts of money to give change, using both £ and p in practical contexts  tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks  estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes, hours and o’clock; use vocabulary such as a.m./p.m., morning, afternoon, noon and midnight  know the number of seconds in a minute and the number of days in each month, year and leap year  compare durations of events, for example to calculate the time taken by particular events or tasks. | Pupils should be taught to:  Convert between different units of measure (e.g. kilometre to metre; hour to minute)  measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres  find the area of rectilinear shapes by counting 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. | Pupils should be taught to:  convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)  understand and use 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 (e.g. using 1 cm3 blocks to build cubes and cuboids) and capacity (e.g. using water)  solve problems involving converting between units of time  use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling. | 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 centimetre cubed (cm3) and cubic metres (m3), and extending to other units such as mm3 and km3. |

Mathematics National Curriculum Statutory Requirements for Programmes of Study Geometry: ◆ Properties of shapes ◆ Position and direction

| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| --- | --- | --- | --- | --- | --- | --- |
| **Geometry:**  **Properties of shapes** | Pupils should be taught to:  recognise and name common 2-D and 3-D shapes, including:  2-D shapes (e.g. rectangles (including squares), circles and triangles)  3-D shapes (e.g. cuboids (including cubes), pyramids and spheres). | Pupils should be taught to:  identify and describe the properties of 2-D shapes, including the number of sides and symmetry in a vertical line  identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces  identify 2-D shapes on the surface of 3-D shapes, for example a circle on a cylinder and a triangle on a pyramid  compare and sort common 2-D and 3-D shapes and everyday objects. | Pupils should be taught to:  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. | Pupils should be taught to:  compare and classify geometric shapes, including quadrilaterals and triangles**,** based on their properties and sizes  identify acute and obtuse angles and compare and order angles up to two right angles by size  identify lines of symmetry in 2-D shapes presented in different orientations  complete a simple symmetric figure with respect to a specific line of symmetry. | Pupils should be taught to:  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 (o)  identify:  angles at a point and one whole turn (total 360o)  angles at a point on a straight line and ½ a turn (total 180o)  other multiples of 90o  use the properties of rectangles to deduce related facts and find missing lengths and angles  distinguish between regular and irregular polygons based on reasoning about equal sides and angles. | Pupils should be taught to:  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. |
| **Geometry: Position and direction** | Pupils should be taught to:  describe position, directions and movements, including half, quarter and three-quarter turns. | Pupils should be taught to:  order and arrange combinations of mathematical objects in patterns  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). |  | Pupils should be taught to:  describe positions on a 2-D grid as coordinates in the first quadrant  describe movements between positions as translations of a given unit to the left/right and up/down  plot specified points and draw sides to complete a given polygon. | Pupils should be taught to:  identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. | Pupils should be taught to:  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. |

Mathematics National Curriculum Statutory Requirements for Programmes of Study ◆ Statistics

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| --- | --- | --- | --- | --- | --- | --- |
| **Domain** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** | **Year 6** |
| **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. | Pupils should be taught to:  interpret and present data using bar charts, pictograms and tables  solve one-step and two-step questions such as ‘How many more?’ and ‘How many fewer?’ using information presented in scaled bar charts and pictograms and tables. | 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. | Pupils should be taught to:  solve comparison, sum and difference problems using information presented in a line graph  complete, read and interpret information in tables, including timetables. | 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. |