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| **Year 5: addition and subtraction** | | | | |
| End of year expectations  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. | | | | Develop links with:   * Multiplication and division * Measurement * Statistics * Geometry |
| End of year 4 prior knowledge 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. | | End of year 4 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. | | |
| **Autumn** | **Spring** | | **Summer** | |
|  |  | | 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.  Continue to discuss whether mental strategies would be more appropriate than formal methods for particular calculations | |

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| **Year 5: multiplication and division** | | | | |
| End of year expectations  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 addition, subtraction, 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. | | | | Develop links with   * Addition and subtraction * Measurement * Fractions |
| End of year 4 knowledge: 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. | | End of year 4 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. | | |
| Autumn | Spring | | Summer | |
|  |  | | * 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 addition, subtraction, 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. | |

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| **Year 5: Fractions** | | | |
| End of year expectations  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. | | | Develop links with:   * Number and place value * Multiplication and division * Measurement * Geometry |
| End of year 4 knowledge: fractions  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. | | | |
| Autumn | Spring | Summer | |
|  |  | * 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. | |

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| **Year 5: Measurement** | | | |
| End of year expectations  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 | | | Develop links with:   * Multiplication and division * Fractions * Geometry |
| End of year 4 knowledge  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 | | | |
| Autumn | Spring | Summer | |
|  |  | 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 | |

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| **Year 5: Geometry** | | | | |
| End of year expectations  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 (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. | | | Geometry: 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. | Develop links with:   * Number and place value * Multiplication and division * Fractions * Geometry |
| End of year 4 expectations  Geometry: properties of shapes  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. | | | Geometry: 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. | |
| Autumn | Spring | Summer | | |
|  |  | * 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 * 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 | | |