**Cambois Primary School** **Long Term Plan Year 5/6**



**Place Value**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/SoLs/Primary/MixedAge/Year-5-and-6-Mixed-Age-Autumn-Block-1-Place-Value-1.pdf>
 |
| Key NC outcomes | * read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
* read Roman numerals to 1000 (M) and recognise years written in Roman numerals
* interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
* 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
* recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)
* 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
* read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
* use negative numbers in context, and calculate intervals across zero
* identify common factors, common multiples and prime numbers
* solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes

DFE GUIDANCE * <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897804/Maths_guidance_year_5.pdf>
* <https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/897805/Maths_guidance_year_6.pdf>
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| Mathematical language | Multiple(Common) factorDivisibleFactor pairsPrime number, Composite numberSquare number, Cube numberPower | Place valueDigitRoman numeralsNegative number |  |
| Useful resources - reasoning  | NRICH: [Factors and multiples KS2](http://nrich.maths.org/8960)NRICH: [Two primes make one square](http://nrich.maths.org/1150)NRICH: [Up and down staircases](http://nrich.maths.org/2283)NRICH: [Sea level](http://nrich.maths.org/5929)NRICH: [Tug Harder!](http://nrich.maths.org/public/viewer.php?obj_id=5898) | NCETM: [Place Value Reasoning](https://www.ncetm.org.uk/public/files/18416215/1_Progression_Map_Place_Value_Reasoning.pdf) (questions in blue) [NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) | I can see reasoning documents in shared area |
| Possible misconceptions  | * Many pupils believe that 1 is a prime number – a misconception which can arise if the definition is taken as ‘a number which is divisible by itself and 1’.
* Some pupils may think that 91 is a prime number as it follows a pattern 11, 31, 41, 61, 71, etc.
* A common misconception is to believe that 62 = 6 × 2 = 12
* Some pupils think the fifth place value is ‘millions’ - eg 24 567 is two million, four thousand, five hundred and sixty seven.
* Some pupils can confuse the language of large (and small) numbers since the prefix ‘milli- means ‘one thousandth’ (meaning that there are 1000 millimetres in a metre for example) while one million is actually a thousand thousand.
* The use of IIII on a clock face suggests that a Roman numeral can be repeated four times, but this is a special case. In general, three is the maximum number of repeats and the subtractive method should be used instead (i.e. IV)
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| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/08/Year-5-Place-Value_End-of-Block-Assessment.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/09/Year-6-Place-Value_End-of-Block-Assessment.pdf> |

**Four operations**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/SoLs/Primary/MixedAge/Year-5-and-6-Mixed-Age-Autumn-Block-2-Four-operations.pdf>
 |
| Key NC outcomes | * add and subtract numbers mentally with increasingly large numbers
* add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
* solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and whymultiply and divide numbers mentally drawing upon known facts
* multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
* 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
* 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
* solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign

**Y6*** divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division; 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
* use written division methods in cases where the answer has up to two decimal places
* solve problems involving division
* perform mental calculations, including with mixed operations and large numbers
* solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
* multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
* solve problems involving addition, subtraction and multiplication
* use their knowledge of the order of operations to carry out calculations
 |
| Mathematical language | AdditionSubtractionSum, TotalDifference, Minus, LessColumn additionColumn subtractionExchangeOperationEstimate | Multiply, Multiplication, Times, ProductCommutativeDivide, Division, DivisibleDivisor, Dividend, Quotient, RemainderFactorShort multiplication, Long multiplicationShort divisionOperationEstimate |  |
| Useful resources - reasoning  | NRICH: [Journeys in Numberland](http://nrich.maths.org/7285)NRICH: [Twenty Divided Into Six](http://nrich.maths.org/public/viewer.php?obj_id=1047)NRICH: [Two and Two](http://nrich.maths.org/public/viewer.php?obj_id=781)NRICH: [Become Maths detectives](http://nrich.maths.org/6928)NRICH: [Exploring number patterns you make](http://nrich.maths.org/8387)NRICH: [Reach 100](http://nrich.maths.org/public/viewer.php?obj_id=1130) | NRICH: [Curious Number](http://nrich.maths.org/7218)NRICH: [Make 100](http://nrich.maths.org/public/viewer.php?obj_id=1013)NRICH [Dicey Operations](http://nrich.maths.org/6606). Games 4 and 5.NRICH: [Factor-multiple chains](http://nrich.maths.org/public/viewer.php?obj_id=5578)NRICH: [The Moons of Vuvv](http://nrich.maths.org/public/viewer.php?obj_id=1066)NRICH: [Round and round the circle](http://nrich.maths.org/public/viewer.php?obj_id=86)NRICH: [Counting cogs](http://nrich.maths.org/6966) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * When subtracting mentally some pupils may deal with columns separately and not combine correctly; e.g. 180 – 24: 180 – 20 = 160. Taking away 4 will leave 6. So the answer is 166.
* Some pupils incorrectly assume and use commutativity within column subtraction; for example:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 7 | 4 | 1 | 2 | 6 |
| – | 2 | 3 | 7 | 3 | 4 |
|  | 5 | 1 | 6 | 1 | 2 |

* Some pupils may not use place value settings correctly (especially when the numbers have a different number of digits)
* Some pupils may write statements such as 2 ÷ 8 = 4
* Some pupils may forget to ‘*put the zero down’* when multiplying the tens digit using long multiplication.
* When using short division many pupils will at first struggle to deal correctly with any division where the divisor is greater than the first digit of the dividend; for example:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 0 | 10 | 7 | r 5 |
| 8 | 3 | 86 | 61 |  |

* 3 ÷ 8 = 0 remainder 3, and so the 3 should be moved across. Instead, the 8 has been ‘moved across’ and therefore everything that follows has been correctly carried out based on an early misunderstanding.
* Some pupils may write statements such as 140 - 190 = 50
* When subtracting mentally some pupils may deal with columns separately and not combine correctly; e.g. 180 – 24: 180 – 20 = 160. Taking away 4 will leave 6. So the answer is 166.
* The use of BIDMAS (or BODMAS) can imply that division takes priority over multiplication, and that addition takes priority over subtraction. This can result in incorrect calculations.
* Some pupils confuse factors and multiples.
* Some pupils can confuse the language of large (and small) numbers since the prefix ‘milli- means ‘one thousandth’ (meaning that there are 1000 millimetres in a metre for example) while one million is actually a thousand thousand.
* Some pupils may not realise that degrees (°) and degrees Celsius (°C) are two different and distinct units of measurement
* Some pupils may think that 1 is a prime number
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| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/10/Year-6-Four-Operations-A_v2.pdf>Will need to combine for y5<https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/10/Year-5-Addition-and-Subtraction_v2.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/Year-5-Multiplication-and-Division.pdf> |

**Fractions**

**Decimals and Percentages**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/10/Year-5-and-6-Mixed-Age-Spring-Block-2-Decimals-and-Percentages.pdf>
 |
| Key NC outcomes | * recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
* read and write decimal numbers as fractions [for example, 0.71 = 71/100]
* read, write, order and compare numbers with 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 involving number up to three decimal places
* recall and use equivalences between simple fractions, decimals and percentages, including in different contexts
 |
| Mathematical language | Tenth, hundredth, thousandthPer cent, PercentageDecimalEquivalentProportion |  |  |
| Useful resources - reasoning  | NCETM: [Fractions Reasoning](https://www.ncetm.org.uk/public/files/18416412/4_Progression_Map_Fractions_Reasoning_.pdf) (questions in blue) | NRICH: [Spiralling decimals](http://nrich.maths.org/10326)NCETM: [Activity D - Metre sticks and metre strips](https://www.ncetm.org.uk/resources/42655)NCETM: [Activity F - Using blank hundred squares](https://www.ncetm.org.uk/resources/42655) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Pupils may not make the connection that a percentage is a different way of describing a proportion
* Some pupils may read 0.234 as ‘nought point two hundred and thirty four’. This leads to the common misconception that, for example, 0.400 is a number larger than 0.76
 |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-1-Year-6-Decimals_v2.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-6-Percentages2.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-5-Decimals-and-Percentages_Assessment.pdf> |
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**Y6 ONLY Algebra**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/10/Year-5-and-6-Mixed-Age-Spring-Block-3-Decimals-and-Algebra.pdf>
 |
| Key NC outcomes | * enumerate possibilities of combinations of two variables
* express missing number problems algebraically
* find pairs of numbers that satisfy an equation with two unknowns
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| Mathematical language | Algebra, algebraic, algebraicallySymbolExpressionVariableSubstituteEquationUnknownEnumerate |  |  |
| Useful resources - reasoning  | NRICH: [Plenty of Pens](https://nrich.maths.org/1117)NRICH: [Your Number Is…](http://nrich.maths.org/2289)NRICH: [Number Pyramids](http://nrich.maths.org/2281)NCETM: [Activity A: Racetrack and Design a board game](https://www.ncetm.org.uk/resources/42893)NCETM: [Activity E: Matchbox Algebra](https://www.ncetm.org.uk/resources/42893) | NCETM: [Algebra](https://www.ncetm.org.uk/public/files/18416474/6_Progression_Map_Algebra_Reasoning.pdf) Reasoning (blue questions) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Some pupils may think that variables have a set value, such as *a* = 1, *b* = 2, *c*  = 3, *d* = 4, etc. (especially if they have done lots of poorly designed treasure hunts/codes) – this will lead to problems such as thinking ‘*b*2 ‘ is the same as ‘2*b*’ because when *b* = 2, *b*2 = 4 and 2*b* = 4.
* Using the idea of ‘apples’ and ‘bananas’ to explain *a* + *b* = 14 can lead to misconceptions about the use of letters as variables.
* Some students may think that the variables have to be positive integers (whole numbers)
 |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-3-Year-6-Algebra_Assessment.pdf> |

**Measurement – units of**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/10/Year-5-and-6-Mixed-Age-Spring-Block-4-Converting-Units.pdf>
 |
| Key NC outcomes | * 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
* use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling
 |
| Mathematical language | Length, distanceMass, weightVolumeCapacityMetre, centimetre, millimetreKilogram, gram | Litre, millilitreHour, minute, secondInch, foot, yardPound, ouncePint, gallon |  |
| Useful resources - reasoning  | NRICH: [Olympic Starters](http://nrich.maths.org/8170)NCETM: [Activity D - Converting between metric units](https://www.ncetm.org.uk/resources/42796)NCETM: [Activity E- Converting between metric and imperial](https://www.ncetm.org.uk/resources/42796) | NCETM: [Measurement Reasoning](https://www.ncetm.org.uk/public/files/18436766/7_Progression_Map_Measurement_Reasoning.pdf) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Some pupils may apply incorrect beliefs about place value, such as 2.3 × 10 = 2.30.
* Many conversions within the metric system rely on multiplying and dividing by 1000. The use of centimetres as an ‘extra unit’ within the system breaks this pattern. Consequently there is a frequent need to multiply and divide by 10 or 100, and this can cause confusion about the connections that need to be applied.
* Some pupils may write amounts of money incorrectly; e.g. £3.5 for £3.50, especially if a calculator is used at any point
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| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/02/Primary_Spring_Mini_Assessments/Spring-Block-4-Mini-Assessment-Year-6-Converting-Measures.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/06/Year-5-Converting-Units-1.pdf> |

**Measurement – area and perimeter**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/10/Year-5-and-6-Mixed-Age-Spring-Block-5-Perimeter-Area-and-Volume.pdf>
 |
| Key NC outcomes | * 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]
* recognise that shapes with the same areas can have different perimeters and vice versa
* calculate the area of parallelograms and triangles
* calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm³) and cubic metres (m³), and extending to other units [for example, mm³ and km³]
* recognise when it is possible to use formulae for area and volume of shape
* solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
 |
| Mathematical language | PerimeterAreaVolumeCapacityDimensionsSquare, rectangle | Composite rectilinearPolygonCube, cuboidMillimetre, Centimetre, Metre, KilometreSquare centimetre, square metreCubic centimetre, centimetre cubeSquare unit |  |
| Useful resources - reasoning  | NRICH: [Area and Perimeter](http://nrich.maths.org/7280)NRICH: [Through the Window](https://nrich.maths.org/10344)NRICH: [Numerically Equal](http://nrich.maths.org/public/viewer.php?obj_id=1045)NRICH: [Cubes](http://nrich.maths.org/42) | NCETM**:** [Activity C: Through the window](https://www.ncetm.org.uk/resources/42805) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Some pupils may apply incorrect beliefs about place value, such as 2.3 × 10 = 2.30.
* Many conversions within the metric system rely on multiplying and dividing by 1000. The use of centimetres as an ‘extra unit’ within the system breaks this pattern. Consequently there is a frequent need to multiply and divide by 10 or 100, and this can cause confusion about the connections that need to be applied.
* Some pupils may write amounts of money incorrectly; e.g. £3.5 for £3.50, especially if a calculator is used at any point
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| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/03/Primary_Mini_Assessments/Spring-Block-5-Mini-Assessment-Year-6-Perimeter-Area-and-Volume.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/Mini_Assessments_Primary_Autumn/Year-5-Area-and-Perimeter.pdf> |

**Statistics**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/10/Year-5-and-6-Mixed-Age-Spring-Block-6-Statistics.pdf>
 |
| Key NC outcomes | * solve comparison, sum and difference problems using information presented in a line graph
* interpret and construct pie charts and line graphs and use these to solve problems
* calculate and interpret the mean as an average
 |
| Mathematical language | DataScaleAxisGraphFrequencyTime graph, Time seriesLine graphBar-line graph, vertical line chartMaximum, minimum | Line graphPie chartSectorAngleProtractorDegrees | AverageMeanMeasureDataStatisticStatisticsApproximateRound |
| Useful resources - reasoning  | NCETM: [Statistics Reasoning](https://www.ncetm.org.uk/public/files/18437062/10_Progression_Map_Statistics_Reasoning.pdf)NRICH: [Birdwatch](http://nrich.maths.org/7553)NRICH: [Probably …](http://nrich.maths.org/7245)NRICH: [Same or Different?](http://nrich.maths.org/public/viewer.php?obj_id=1176) | NRICH: [Take Your Dog for a Walk](http://nrich.maths.org/4803)NRICH: [Match the Matches](http://nrich.maths.org/public/viewer.php?obj_id=4937)NRICH: [Graphing Number Patterns](http://nrich.maths.org/1174) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Some pupils may think that a line graph is appropriate for discrete data
* Some pupils may think that a line graph is the same a bar-line chart
* Some pupils may think that one centimetre represents one unit.
* Some pupils may think the larger the size of the pie chart, the greater the total frequency
* Some pupils may think if two pie charts have the same section then the amount of data the section represents is the same in each pie chart.’
* Some pupils may confuse the fact that the sections of the pie chart total 100% and 360°
* Some pupils may think that a line graph is appropriate for discrete data
* Some pupils may think that each square on the grid used represents one unit
* If using a calculator some pupils may not use the ‘=’ symbol (or brackets) correctly; e.g. working out the mean of 2, 3, 4 and 5 as 2 + 3 + 4 + 5 ÷ 4 = 10.25.
* Some pupils may think the average is always the middle number
* Some pupils may think that the mean must be a whole number
* Some pupils may not realise that the mean must lie within the range of the data set.
 |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/05/Year-6-Statistics.pdf> |

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2020/03/2020/03/Year-5-and-6-Mixed-Age-Guidance-Summer-Block-1-Properties-of-Shape.pdf>
 |
| Key NC outcomes | * identify 3-D shapes, including cubes and other cuboids, from 2-D representations
* 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
* 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 1/2 a turn (total 180°); other multiples of 90°#
* recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
 |
| Mathematical language | CubeCuboidCylinderPyramidPrismConeSphere2D3DNetSketchIsometric paper  | Quadrilateral, Square, Rectangle, Parallelogram, (Isosceles) Trapezium, Kite, Rhombus, Delta, ArrowheadTriangle, Scalene, Right-angled, Isosceles, EquilateralPolygon, Regular, IrregularPentagon, Hexagon, Octagon, Decagon, DodecagonCircle, Radius, Diameter, Circumference, CentreParallelDiagonalAngle | TurnAngleDegreesRight angleAcute angleObtuse angleReflex angleProtractorVertically opposite |
| Useful resources - reasoning  | NRICH: [The Third Dimension](http://nrich.maths.org/1148)NRICH: [A Puzzling Cube](http://nrich.maths.org/1140)NRICH: [Rolling That Cube](http://nrich.maths.org/7299)NRICH: [Where Are They?](http://nrich.maths.org/public/viewer.php?obj_id=1058)NRICH: [Round a Hexagon](http://nrich.maths.org/8095)NRICH: [Quadrilaterals](http://nrich.maths.org/public/viewer.php?obj_id=962) | NCETM: [Geometry - Properties of Shapes Reasoning](https://www.ncetm.org.uk/public/files/18438967/8_Progression_Map_Geometry_properties_of_shapes_Reasoningv2.pdf)NRICH: [Estimating Angles](http://nrich.maths.org/1235)NCETM: [Activity A: Logo Challenge 1 – Star Square](https://www.ncetm.org.uk/resources/42849)NCETM: [Activity C: Equal angles](https://www.ncetm.org.uk/resources/42849)NCETM: [Activity D: Sorting triangles](https://www.ncetm.org.uk/resources/42849) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Pupils must have isometric paper in portrait orientation for it to work correctly.
* When drawing a cube on isometric paper, some students may think that they need to join dots to make a square first, and will draw horizontal and vertical lines to attempt to achieve this
* Correct use of isometric paper must not indicate ‘hidden’ lines#
* Some pupils may think that a ‘regular’ polygon is a ‘normal’ polygon
* Some pupils may think that all polygons have to be regular
* Some pupils may think that a square is only square if ‘horizontal’, and even that a ‘non-horizontal’ square is called a diamond
* The equal angles of an isosceles triangle are not always the ‘base angles’ as some pupils may think
* Some pupils use the wrong scale on a protractor. For example, they measure an obtuse angle as 60° rather than 120°.
* Some pupils may think that 90° is either an acute or obtuse angle.
* Some pupils may think it is not possible to measure a reflex angle.
* Some pupils may think that these angles are not equal as they are not ‘vertical’.

xx* Some pupils may think that angles that are ‘roughly’ opposite are always equal, e.g. a = c

aabdc |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/04/2019/04/2019/04/Year-6-Properties-of-Shape.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/04/Year-5-Properties-of-Shape.pdf> |

**Properties of shape**

**Position and direction**

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| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2020/03/2020/03/Year-5-and-6-Mixed-Age-Guidance-Summer-Block-2-Position-and-Direction.pdf>
 |
| Key NC outcomes | * 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 coordinate grid (all four quadrants)
* draw and translate simple shapes on the coordinate plane, and reflect them in the axes
 |
| Mathematical language | 2-DGridAxis, axes, x-axis, y-axisOrigin(First) quadrant(Cartesian) coordinatesPointTranslationReflectionTransformationObject, ImageCongruent, congruence | Quadrilateral, Square, Rectangle, Parallelogram, (Isosceles) Trapezium, Kite, Rhombus, Delta, ArrowheadTriangle, Scalene, Right-angled, Isosceles, EquilateralPolygon, Regular, IrregularPentagon, Hexagon, Octagon, Decagon, DodecagonCircle, Radius, Diameter, Circumference, CentreParallelDiagonalAngle |  |
| Useful resources - reasoning  | NRICH: [Transformations on a Pegboard](http://nrich.maths.org/public/viewer.php?obj_id=1813)NRICH: [Square Corners](http://nrich.maths.org/public/viewer.php?obj_id=1142)NCETM: [Activity A: Translation or Destination](https://www.ncetm.org.uk/resources/42944)NCETM: [Geometry: Position Direction and Movement Reasoning](https://www.ncetm.org.uk/public/files/18436990/9_Progression_Map_Geometry_position_direction_and_movement_Reasoning.pdf) | NRICH: [Cops and Robbers](http://nrich.maths.org/public/viewer.php?obj_id=6288)NRICH: [Eight Hidden Squares](http://nrich.maths.org/public/viewer.php?obj_id=6280)NRICH: [Coordinate Tan](http://nrich.maths.org/public/viewer.php?obj_id=1109)NRICH: [Transformation Tease](http://nrich.maths.org/1111)NCETM: [Activity B - Battleships](https://www.ncetm.org.uk/resources/42950) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * When describing or carrying out a translation, some pupils may count the squares between the two shapes rather than the squares that describe the movement between the two shapes.
* When carrying out a reflection some pupils may think that the object and image should be an equal distance from the edge of the grid, rather than an equal distance form the mirror line.
* Some pupils will confuse the order of x-coordinates and y-coordinates
* When constructing axes, some pupils may not realise the importance of equal divisions on the axes
 |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/05/Year-5-Position-and-direction-1.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/Mini_Assessments_Primary_Autumn/Year-6-Position-and-Direction.pdf> |

**Fractions**

|  |  |
| --- | --- |
| Link to WRMH small steps | * <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/SoLs/Primary/MixedAge/Year-5-and-6-Mixed-Age-Autumn-Block-3-Fractions.pdf>
 |
| Key NC outcomes | * 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
* use common factors to simplify fractions; use common multiples to express fractions in the same denomination
* compare and order fractions, including fractions > 1
* associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]
* 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
* solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 1/5, 2/5, 4/5 and those fractions with a denominator of a multiple of 10 or 25
* solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
 |
| Mathematical language | FractionNumeratorDenominatorImproper fraction, Proper fraction, Vulgar fraction, Top-heavy fraction | SimplifyEquivalentLowest terms |  |
| Useful resources - reasoning  | NRICH: [Matching fractions](http://nrich.maths.org/8283)NRICH: [Fractions made faster](http://nrich.maths.org/4561)NCETM: [Fractions Reasoning](https://www.ncetm.org.uk/public/files/18416412/4_Progression_Map_Fractions_Reasoning_.pdf) (questions in blue) | NRICH: [Forgot the Numbers](http://nrich.maths.org/public/viewer.php?obj_id=1015) NCETM: [Activity A - Fractions ITP](https://www.ncetm.org.uk/resources/42655)NRICH: [Fractions Jigsaw](http://nrich.maths.org/public/viewer.php?obj_id=5467&part=index&refpage=monthindex.php)NRICH: [Peaches Today, Peaches Tomorrow](http://nrich.maths.org/2312/index)NRICH: [Andy’s Marbles](http://nrich.maths.org/public/viewer.php?obj_id=2421)NRICH: [Would you Rather?](http://nrich.maths.org/public/viewer.php?obj_id=1118) | I can see reasoning (see shared area)[NCETM mastery Y5](https://www.ncetm.org.uk/public/files/23305632/Mastery_Assessment_Y5_Low_Res.pdf)[NCETM mastery y6](file:///C%3A%5CUsers%5CUSER%5CDownloads%5CMastery_Assessment_Y6_Low_Res.pdf) |
| Possible misconceptions  | * Some pupils may think that equivalent fractions are found using an additive relationship rather than a multiplicative one: for example, that the fraction 4/5 is equivalent to 6/8
* A fraction can be visualised as divisions of a shape (especially a circle) but some pupils may not recognise that these divisions must be equal in size, or that they can be divisions of any shape.
* Pupils may think that the larger the numerator / denominator the larger the fraction and vice versa
* Some pupils may think that simplifying a fraction just requires searching for, and removing, a factor of 2 (repeatedly)
* Some pupils may think that you simply add the numerators and add the denominators when adding fractions.
* Some pupils may think that you simply subtract the numerators and subtract the denominators when subtracting fractions.
* Some pupils may think that you simply multiply both the numerator denominator when multiplying a fraction by a whole number.
* Some pupils may think that you simply multiply the whole number and then the fraction when multiplying a mixed number by a whole number, e.g. $3\frac{3}{4}× 2=6\frac{6}{4}$
 |
| Assessment | <https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-5-fractions-A.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2019/01/Primary_Spring_Mini_Assessments/Spring-Block-2-Year-5-Fractions-B.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/11/Year-6-Fractions-A-1.pdf><https://wrm-13b48.kxcdn.com/wp-content/uploads/2018/11/Year-6-Fractions-B.pdf> |