Mathematics Mastery

Year 5 Programme of Study – *'Term per page overview' 2016-2017*

Term		National Curriculum requirements
Autumn	**Unit 1** **Reasoning with large whole numbers** **(2 weeks)**	• 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 • 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 • interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero • read Roman numerals to 1000 (M) and recognise years written in Roman numerals
	Unit 2 **Problem solving with integer addition and subtraction** **(2 weeks)**	• 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) • 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
	Unit 3 **Factors and prime numbers** **(1 weeks)**	• identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers • recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) • 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
	Unit 4 **Multiplication and division** **(2 weeks)**	• multiply and divide numbers mentally drawing upon known facts • multiply and divide whole numbers by 10, 100 and 1000 • solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes • 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
	Unit 5 **Converting units – weight, length (perimeter) and time** **(1 week)**	• measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • multiply and divide whole numbers by 10, 100 and 1000 • understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints • solve problems involving converting between units of time
	Unit 6 **Volume and area** **(2 weeks)**	• calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of non-rectilinear shapes • estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]

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Spring	**Unit 7** **Fractions and decimals** **(3 weeks)**	• read, write, order and compare numbers with up to three decimal places • compare and order fractions whose denominators are all multiples of the same number • recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents • 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, $\frac{2}{5}+\frac{4}{5}=\frac{6}{5}=1\frac{1}{5}$] • identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths • read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$] • round decimals with two decimal places to the nearest whole number and to one decimal place • solve problems involving number up to three decimal places • use all four operations to solve problems involving measure (for example length, mass, volume, money) using decimal notation, including scaling • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
	Unit 8 **Angles** **(2 weeks)**	• 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 $\frac{1}{2}$ a turn (total 180°); other multiples of 90°
	Unit 9 **Fractions, decimals and percentages** **(3 weeks)**	• 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 • 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 involving multiplication and division, including scaling by simple fractions and problems involving simple rates • solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those percentages that are multiples of 10 and 25. • solve problems involving number up to three decimal places • use all four operations to solve problems involving measure (for example length, mass, volume, money) using decimal notation, including scaling • multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
	Unit 10 **Line graphs and timetables** **(2 weeks)**	• solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables • solve problems involving converting between units of time

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Summer	**Unit 11** **Transformations** **(2 weeks)**	• 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 • use the properties of rectangles to deduce related facts and find missing lengths and angles • describe positions on the full coordinate grid (all four quadrants) (Y6)
	Unit 12 **Calculating with whole numbers and decimals** **(3 weeks)**	• consolidation and application opportunities
	Unit 13 **Angles, 2-D and 3-D shape** **(2 weeks)**	• 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 $\frac{1}{2}$ a turn (total 180°); other multiples of 90° • 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 • identify 3-D shapes, including cubes and other cuboids, from 2-D representations • recognise, describe and build simple 3-D shapes, including making nets (Y6) • illustrate and name parts of circles, including radius, diameter and circumference and know that diameter is twice the radius. (Y6)
	Unit 14 **Calculating with whole numbers and decimals** **(3 weeks)**	• consolidation and application opportunities • solve problems involving the calculation of percentages (Y6) • calculate and interpret the mean as an average (Y6) • use common factors to simplify fractions; use common multiples to express fractions in the same denomination (Y6) • associate a fraction with division (Y6)