South Farnborough Junior School

Year 5 Long Term Planning

Topic	Objectives / Key concepts	Misconceptions
Number: Place Value	• 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}) solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes	• 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 $6^2 = 6 \times 2 = 12$
Number: Addition and Subtraction	• 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 why	• 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)
Statistics	• solve comparison, sum and difference problems using information presented in a line graph	• 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.

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Number: Multiplication and Division	• multiply 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	• 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 $^{8}6$ $^{6}1$ 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.
Measurement: Perimeter and Area	• 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 (cm^2) and square metres (m^2) and estimate the area of irregular shapes • estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	• Some pupils may confuse the concepts of area and perimeter • Some pupils may think that you multiply the numbers to find the perimeter of a shape. • Some pupils may think that you cannot find the perimeter of a shape unless all the dimensions are given. • Some pupils may just add the given dimensions, rather than consider any unlabelled dimensions Some pupils may think that you multiply all the numbers to find the area of a rectangle
Number: Fractions	• 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 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, $^{2}/_{5} + {}^{4}/_{5} = {}^{6}/_{5} = 1\ {}^{1}/_{5}$] • 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	• 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 • 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. $3\frac{3}{4} \times 2 = 6\frac{6}{4}$

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Number: Decimals and Percentages	• 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	• 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 • Pupils may not make the connection that a percentage is a different way of describing a proportion
Geometry: Properties of Shape	• 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° identify 3-D shapes, including cubes and other cuboids, from 2-D representations	• 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. • 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
Geometry: Position and Direction	• 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	• 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 • 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 use coordinates the wrong way round; for example, interpreting the point (3,2) as 3 up and 2 across (to the right)
Measurement: Converting Units / volume	• 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	• 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