Whole School Maths Curriculum Overview: Year 5

#TheSmawthorneExperience

Year 5	Spring Term				
Topic	Multiplication and Division B	Fractions B	Decimals and Percentages	Perimeter and Area	Statistics
The Big Ideas	Pupils have a firm understanding of what multiplication and division mean and have a range of strategies for dealing with large numbers, including both mental and standard written methods. They see the idea of factors, multiples and prime numbers as connected and not separate ideas to learn. They recognise how to use their skills of multiplying and dividing in new problem solving situations. Fractions and division are connected ideas: 36 ÷ 18 = 3 1 6 8 = 2; 1 38 6 = 1 2 . Factors and multiples are connected ideas: 48 is a multiple of 6 and 6 is a factor of 48.	Representations that may appear different sometimes have similar underlying ideas. For example 1 4 , 0·25 and 25% are used in different contexts but are all connected to the same idea.		The relationship between area and perimeter is not a simple one. Increasing or decreasing area does not necessarily mean the perimeter increases or decreases respectively, or vice versa. Area is measured in square units. For rectangles, measuring the length and breadth is a shortcut to finding out how many squares would fit into each of these dimensions.	Different representations highlight different aspects of data. It is important to be able to answer questions about data using inference and deduction, not just direct retrieval.
Key Knowledge and Skills	• Step 1 Multiply up to a 4-digit number by a 1-digit number • Step 2 Multiply a 2-digit number by a 2-digit number (area model) • Step 3 Multiply a 2-digit number by a 2-digit number	• Step 1 Multiply a unit fraction by an integer • Step 2 Multiply a non-unit fraction by an integer • Step 3 Multiply a mixed number by an integer	• Step 1 Decimals up to 2 decimal places • Step 2 Equivalent fractions and decimals (tenths) • Step 3 Equivalent fractions and decimals (hundredths)	• Step 1 Perimeter of rectangles • Step 2 Perimeter of rectilinear shapes • Step 3 Perimeter of polygons • Step 4 Area of rectangles	• Step 1 Perimeter of rectangles • Step 2 Perimeter of rectilinear shapes • Step 3 Perimeter of polygons • Step 4 Area of rectangles

	• Step 4 Multiply a 3-digit number by a 2-digit number • Step 5 Multiply a 4-digit number by a 2-digit number • Step 6 Solve problems with multiplication • Step 7 Short division • Step 8 Divide a 4-digit number by a 1-digit number • Step 9 Divide with remainders • Step 10 Efficient division •	• Step 4 Calculate a fraction of a quantity • Step 5 Fraction of an amount • Step 6 Find the whole • Step 7 Use fractions as operators	• Step 4 Equivalent fractions and decimals • Step 5 Thousandths as fractions • Step 6 Thousandths as decimals • Step 7 Thousandths on a place value chart • Step 8 Order and compare decimals (same number of decimal places) • Step 9 Order and compare any decimals with up to 3 decimal places • Step 10 Round to the nearest whole number • Step 11 Round to 1 decimal place • Step 12 Understand percentages • Step 13 Percentages as fractions • Step 14 Percentages as decimals • Step 15 Equivalent fractions, decimals and percentages	• Step 5 Area of compound shapes • Step 6 Estimate area	• Step 5 Area of compound shapes • Step 6 Estimate area
Sentence Stems	• Common multiples Common multiples of given numbers are numbers that are in the times tables of both numbers. Common multiples of (number a) and (number b) are .... • Common multiples of 2 and 5 are 10, 20, 30... Composite numbers All numbers with more than two factors are composite numbers. Prime numbers A	• Thousandths (Fractions) 5 Zero is a place holder. Zero has no value. (number) thousandth(s) is/are the same as (number) out of one thousand equal parts. • 321 thousandths are the same as 321 out of one thousand equal parts. Improper and Mixed Number Fractions An improper fraction is a fraction with a numerator is greater than the denominator. A mixed number contains an integer and a proper fraction. In the fraction (fraction), (number) equal parts make one whole. • In the fraction 6/5, 5 equal parts make one whole. Finding Common Multiples (Fractions) (denominator) and (denominator) have a lowest		• Area For rectangles, the area of a shape is calculated by multiplying the length by the width. Area is measured in units squared or unit^2. • "To find the perimeter, I need to..." • "The perimeter of this shape is..."	• "The graph shows that..." • "The highest point on the graph represents..." • "The lowest point on the graph represents..." • "There is a greater increase/decrease between...and..."

	prime number only has two factors, 1 and itself. Multiplying by 1,000 When multiplying by 1,000, the digits move three places to the left. When multiplying by 1,000, the number is 1,000 times bigger. Square number A square number is made when you multiply a number by itself. (number) x (number) = (product), so (product) is a square number. • 4 × 4 = 16, so 16 is a square number.	common multiple of (number). The fractions can both have a denominator of (lowest common multiple). • (For ½ and 1/5) 2 and 5 have a lowest common multiple of 10. The fractions can both have a denominator of 10. • Multiplying by 10/ 100/ 1,000 (Decimals) When multiplying by (10/ 100/ 1,000), the number is (10/ 100/ 1,000) times bigger. When multiplying by (10/ 100/ 1,000), we move the digits (one/ two/ three) places to the left. When dividing by (10/ 100/ 1,000), the number is (10/ 100/ 1,000) times smaller. When dividing by (10/ 100/ 1,000), we move the digits (one/ two/ three) places to the right.	• "The perimeter is the total length of..." • "If I know one side of a square, I can find the perimeter by..." • "To find the missing side length, I can..." • "The perimeter of a rectangle is calculated by..." • "If I double the length and width of a rectangle, the perimeter wil	• "The difference between...and...is..." • "The trend shown in the graph is..."
National Curriculum Statements	know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers establish whether a number up to 100 is prime and recall prime numbers up to 19 Spring 1 Multiplication and Divison 2 • 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 including using their knowledge of factors and multiples, squares and cubes • solve problems involving addition, subtraction, multiplication	• 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 [for example, 5 2 + 5 4 = 5 6 = 1 5 1 • 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 Number: Decimals and Percentages • read and write decimal numbers as fractions [for example, 0.71 = 100 71] • 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 100, and as a decimal • solve problems which require knowing percentage and decimal equivalents of 2 1 , 4 1 , 5 1 , 5 2 , 5 4 and those fractions with a denominator of a multiple of 10 or 25.	Pupils should be taught to: • convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) • 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 • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.	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.

	and division and a combination of these, including understanding				
Misconceptions	• Children may make errors when multiplying by zero. • Children may omit the exchange or include the exchange in an incorrect column in the formal written method. • Children may write more than one digit in a single column rather than make an exchange. • Children may complete the area model and then forget to add together the parts. • When moving away from using concrete resources, children may make errors when multiplying by powers of 10, for example thinking that 30 × 40 = 120 instead of 1,200 • Children may omit the zero as a placeholder when multiplying by the tens digit. • When an exchange is needed in the multiplication steps, children may accidently also add the exchanged number in the final addition. Crossing out the exchange once it has been used may help to prevent this	• Children may think that when multiplying, the answer is always greater than both of the numbers. For example, they may think the result of 3 × 1 10 must be greater than 3 • Children may multiply both the numerator and the denominator by the integer, and not recognise that this is the process for finding equivalent fractions, not for multiplying fractions by integers. • Children may think that when multiplying, the answer is always greater than both of the numbers. For example, they may think the result of 3 × 3 10 must be greater than 3 • Children need to be confident in converting between improper fractions and mixed numbers. • Children may write their answer as a whole number and an improper fraction rather than a mixed number. • Children may use an inefficient method to solve a calculation, for example using	• Children may write their answer as a whole number and an improper fraction rather than a mixed number. • Children may use an inefficient method to solve a calculation, for example using improper fractions to work out 4 × 8 3 15 • Children may make errors converting between improper fractions and mixed numbers. • Children may count up in 0.1s to 0.10 ("zero point ten"). • Children may confuse the words "tens" and "tenths". • Children may confuse the words "hundreds" and "hundredths". • When converting a decimal into tenths and hundredths,	• Children may line up the object they are measuring with the end of the ruler rather than the zero mark. • When given the length and width of a rectangle, children may just add the two amounts. • When measuring sides on a rectangle, children may get different dimensions for sides that should be equal. • Children may miscount when adding the sides of rectilinear shapes. • If children do not have a secure understanding of addition and subtraction, they may struggle when f inding missing sides. • Children may find it difficult to see that the two shorter sides are equal to the longer opposite side on the rectilinear shape.	• Children may need support in choosing appropriate intervals for the vertical axis. • Children may begin a scale from zero even if the lowest value is considerably greater than this. • Children may not estimate accurately between two given values. • Children may not draw straight lines from the axis to the graph when reading off, so give inaccurate answers "by eye". • Children may choose an inappropriate estimate when the point is between two intervals. • Children may use the incorrect operation when answering questions about a table, especially for questions such as "How many more ... ?" • Tables with more than two categories of information can be harder to interpret.

		improper fractions to work out 4 × 8 3 15 • Children may make errors converting between improper fractions and mixed numbers.			
Progression	Year 4: • Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. • Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication. • Understand and apply the distributive property of multiplication. Year 6: • solve problems involving addition, subtraction, multiplication and division • use their knowledge of the order of operations to carry out calculations involving the four operations • 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	Year 4 : • Reason about the location of mixed numbers in the linear number system. • Convert mixed numbers to improper fractions and vice versa • Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers. Year 6: • Recognise when fractions can be simplified, and use common factors to simplify fractions. • Express fractions in a common denomination and use this to compare fractions that are similar in value. • Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.		Year 4: • Convert between different units of measure [for example, 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 Year 6: • recognise that shapes with the same areas can have different perimeters and vice versa	Year 4: • 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 Year 6 • interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average.

	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 • perform mental calculations, including with mixed operations and large number			
Key Vocabulary	lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times… ten times… times as (big, long, wide… and so on) repeated addition array row, column double, halve share, share equally one each, two each, three each… group in pairs, threes… tens equal groups of divide, division, divided by, divided into remainder factor, quotient, divisible by inverse	part, equal parts fraction, proper/improper fraction mixed number numerator, denominator equivalent, reduced to, cancel one whole half, quarter, eighth third, sixth, ninth, twelfth fifth, tenth, twentieth, hundredth proportion, ratio in every, for every to every, as many as decimal, decimal fraction decimal point, decimal place percentage, per cent, %	area, covers, surface square centimetre (cm^2), square metre (m^2) square millimetre (mm^2)	count, tally, sort, vote survey, questionnaire data, database graph, block graph, line graph pictogram, represent group, set list, chart, bar chart, bar line chart tally chart