Whole School Maths Curriculum Overview: Year 4

#TheSmawthorneExperience

Year 4	Spring Term			
Topic	Multiplication and Division B	Length and Perimeter	Fractions	Decimals A
The Big Ideas	It is important for children not just to be able to chant their multiplication tables but to understand what the facts in them mean, to be able to use these facts to figure out others and to use them in problems. It is also important for children to be able to link facts within the tables (e.g. 5× is half of 10×). They understand what multiplication means and see division as both grouping and sharing, and to see division as the inverse of multiplication. The distributive law can be used to partition numbers in different ways to create equivalent calculations. For example, 4 × 27 = 4 × (25 + 2) = (4 × 25) + (4 × 2) = 108. Looking for equivalent calculations can make calculating easier. For example, 98 × 5 is equivalent to 98 × 10 ÷ 2 or to (100 × 5) – (2 × 5). The array model can help show equivalences.	The smaller the unit, the greater the number of units needed to measure (that is, there is an inverse relationship between size of unit and measure).	Fractions arise from solving problems, where the answer lies between two whole numbers. Fractions express a relationship between a whole and equal parts of a whole. Children should recognise this and speak in full sentences when answering a question involving fractions. For example, in response to the question What fraction of the chocolate bar is shaded? the pupil might say Two sevenths of the whole chocolate bar is shaded. Equivalency in relation to fractions is important. Fractions that look very different in their symbolic notation can mean the same thing.	
Key Knowledge and Skills	• **Step 1** Factor pairs • **Step 2** Use factor pairs • **Step 3** Multiply by 10 • **Step 4** Multiply by 100 • **Step 5** Divide by 10 • **Step 6** Divide by 100 • **Step 7** Related facts – multiplication and division • **Step 8** Informal written methods for multiplication • **Step 9** Multiply a 2-digit number by a 1-digit number • **Step 10** Multiply a 3-digit number by a 1-digit number	• **Step 1** Measure in kilometres and metres • **Step 2** Equivalent lengths (kilometres and metres) • **Step 3** Perimeter on a grid • **Step 4** Perimeter of a rectangle • **Step 5** Perimeter of rectilinear shapes • **Step 6** Find missing lengths in rectilinear shapes • **Step 7** Calculate the perimeter of rectilinear shapes	• **Step 1** Understand the whole • **Step 2** Count beyond 1 • **Step 3** Partition a mixed number • **Step 4** Number lines with mixed numbers • **Step 5** Compare and order mixed numbers • **Step 6** Understand improper fractions • **Step 7** Convert mixed numbers to improper fractions • **Step 8** Convert improper fractions to mixed numbers • **Step 9** Equivalent fractions on a number line	• **Step 1** Tenths as fractions • **Step 2** Tenths as decimals • **Step 3** Tenths on a place value chart • **Step 4** Tenths on a number line • **Step 5** Divide a 1-digit number by 10 • **Step 6** Divide a 2-digit number by 10 • **Step 7** Hundredths as fractions

	• **Step 11** Divide a 2-digit number by a 1-digit number (1) • **Step 12** Divide a 2-digit number by a 1-digit number (2) • **Step 13** Divide a 3-digit number by a 1-digit number • **Step 14** Correspondence problems • **Step 15** Efficient multiplication	• **Step 8** Perimeter of regular polygons • **Step 9** Perimeter of polygons	• **Step 10** Equivalent fraction families • **Step 11** Add two or more fractions • **Step 12** Add fractions and mixed numbers • **Step 13** Subtract two fractions • **Step 14** Subtract from whole amounts • **Step 15** Subtract from mixed numbers	• **Step 8** Hundredths as decimals • **Step 9** Hundredths on a place value chart • **Step 10** Divide a 1- or 2-digit number by 100
Stem Sentences	When zero is a factor, the product i s zero. For every group of one twelve, there are two groups of s ix. All multiple of tens have a ones digit of zero. is divided into groups of There are groups and a remainder of . Products in the time table are also in the time table. The remainder is always less than the divisor. When we divide, the whole is known and the number or parts or the value of the parts is also known. All multiples of one hundred have both a tens and ones digit of zero	Kilo- as a prefix means thousand. To convert from kilometres to metres, multiply by 1,000. To convert from metres to kilometres, divide by 1,000. When multiplying by 1,000, the digits move three places to the left. When dividing by 1,000, the digits move three places to the right. Area The area is the size of the surface of a 2-D shape. There are (number) squares in each row. There are (number) rows. (number) rows of (number) squares = (number) squares. The area is (number) squares . • There are 2 squares in each row. There are 3 rows. 3 rows of 2 squares = 6 squares. The area is 6 squares.	The line is divided into equal parts. This allows us to count in . The denominator is . This means that the whole has been split into equal parts. When a whole number is multiplied by a unit fraction, i t makes the whole number smaller. The parts are and . The total or whole is . When comparing fractions with the same denominator, the greater the numerator, the greater the fraction.	

National Curriculum Statements	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 3 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 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects	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	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 100 and dividing tenths by 10 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 hundreds 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 1 decimal place to the nearest whole number compare numbers with the same number of decimal places up to 2 decimal places solve simple measure and money problems involving fractions and decimals to 2 decimal places	
Misconception	• Children may not work systematically, meaning that they could miss some factor pairs. • Children may find it difficult to understand why not all factors come in pairs, for example 4 × 4 = 16, so this only gives 1 factor of 16, not 2 • Children may need support finding the appropriate factor pairs that will enable them to solve the calculation mentally. • Children may partition a number rather than finding a factor pair Children may move only one digit and misplace the placeholder, for example 45 × 10 = 405 • Children may not realise that calculations of the form 10 × same way. and × 10 can be carried out in the • Children may move only some of the digits and misplace the placeholder, for example 45 × 100 = 4,005 • Children may need support to recognise that multiplying by 100 is the same as multiplying by 10 and multiplying by 10 again. • Children may incorrectly conclude that to divide by 10, they always just remove a zero from the number.	• Children may ignore the unit of measurement and just compare the numbers involved. For example, they might think that 2 km and 60 m is less than 1 km and 700 m, because 260 is less than 1,700 • Children may think that 1 km = 100 m, based on the relationship between metres and centimetres. • Children may mix up the conversions between different metric units, for example thinking that 1 km = 100 m. • Children may make errors when counting in 1,000s. • Children may just consider the numbers and not the units and think that, for example, 70 m is greater than 7 km as 70 is greater than 7 • Children may only add the width and length of one side, or the sides labelled, rather than all the sides of the shape. • Children may forget to include the unit of measurement. • Children may count all the squares around the outside of the shape, rather than the lengths of the sides.	• Children may not be able to identify or explain whether a fraction is a large or small part of the whole . • When trying to identify how many equal parts the whole has been divided into, some children may be reliant on diagrams rather than using the denominator. • Children may think that fractions must be less than 1 • When crossing a whole number, particularly when counting in non-unit fractions, children may miscount, either stopping at the whole number or ignoring it, for example 4 6 , 5 6 , 1 1 6 • Children may mistake mixed numbers for improper fractions, particularly if their presentation is not clear, for example mistaking 2 3 4 for 23 4 • Children need to be secure in the fact that all whole numbers can be made up of fractions, for example 1 whole = 3 3 • Children may be less confident with non-standard partitions, for example 2 3 4 = 2 1 4 + 2 • Children may incorrectly count the number of intervals when working out what fraction the number line is counting in.	• Children may see the pattern of 1 10 , 2 10 , 3 10 … without understanding each part's worth and how it fits in with the whole. • Seeing one-tenth in an unfamiliar place can confuse children, for example a bar split into 10 with the 9th bar shaded. Children may see this as 9 10 • Children may forget to include the decimal point. • If the number of tenths reaches 10, children may call this "zero point ten" and write 0.10 rather than exchanging for 1 one. • Children may confuse the words "tens" and "tenths". • If the number of tenths reaches 10, children may call this "zero point ten" and write 0.10 rather than exchanging for 1 one. • When counting up in tenths, children may go from 9 tenths to 0 tenths, but

	• Children may confuse multiplying and dividing by 10, and move the digits in the wrong direction in a place value chart.	• Children may only add the lengths of the sides that are labelled rather than using more efficient methods involving multiplication. • Children may not check the units given in the diagrams and so fail to convert them if there are mixed units	• Children may struggle to estimate on a number line if they are not secure in their knowledge of which whole a fraction is closer to.	then forget to increase the value of the ones column, for example 1.8, 1.9, 1.0, 1.1 …
Progression	Year 3:• recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables • write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods • solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects Year 5: • Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size. • Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors. • Multiply any whole number with up to 4 digits by any one-digit number using a formal written method. • Divide a number with up to 4 digits by a one-digit number using a formal written	Year 3: • measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • measure the perimeter of simple 2-D shapes Year 5: • 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.	Year 3: count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10 • recognise, find and write fractions of a discrete set of objects: unit fractions and nonunit fractions with small denominators • recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators recognise and show, using diagrams, equivalent fractions with small denominators add and subtract fractions with the same denominator within one whole [for example, 5/7 + 1/7 = 6/7] • compare and order unit fractions, and fractions with the same denominators solve problems that involve all of the above. Year 5: • Find non-unit fractions of quantities. • Find equivalent fractions and understand that they have the same value and the same position in the linear number system. • Recall decimal fraction equivalents for 1/2, 1/4, 1/5 and 1/10 and for multiples of these proper fractions.	Year 3: Topic starts in Year 4 Year 5: • 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

	method, and interpret remainders appropriately for the context			
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	length, width, height, depth, breadth long, short, tall, high, low wide, narrow, deep, shallow, thick, thin longer, shorter, taller, higher… and so on longest, shortest, tallest, highest… and so on far, further, furthest, near, close distance apart/between, distance to… from… edge, perimeter kilometre (km), metre (m) centimetre (cm), millimetre (mm) mile ruler, metre stick, tape measure	part, equal parts fraction one whole half, quarter, eighth third, sixth fifth, tenth, twentieth proportion, in every, for every decimal, decimal fraction decimal point, decimal place	