Whole School Maths Curriculum Overview: Year 4

#TheSmawthorneExperience

Year 4	Autumn Term			
Topic	Place Value	Addtion and subtraction	Measurement (area)	Multiplication and division A
The Big Ideas	Imagining the position of numbers on a horizontal number line helps us to order them: the number to the right on a number line is the larger number. So 5 is greater than 4, as 5 is to the right of 4. But –4 is greater than –5 as –4 is to the right of –5. Rounding numbers in context may mean rounding up or down. Buying packets of ten cakes, we might round up to the nearest ten to make sure everyone gets a cake. Estimating the number of chairs in a room for a large number of people we might round down to estimate the number of chairs to make sure there are enough. We can think of place value in additive terms: 456 is 400 + 50 + 6, or in multiplicative terms: one hundred is ten times as large as ten.	It helps to round numbers before carrying out a calculation to get a sense of the size of the answer. For example, 4786 – 2135 is close to 5000 – 2000, so the answer will be around 3000. Looking at the numbers in a calculation and their relationship to each other can help make calculating easier. For example, 3012 – 2996. Noticing that the numbers are close to each other might mean this is more easily calculated by thinking about subtraction as difference.	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).	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.
Key Knowledge and Skills	• Represent numbers to 1,000 • Partition numbers to 1,000 • Number line to 1,000 • Thousands Represent numbers to 10,000 Partition numbers to 10,000	• Add and subtract 1s, 10s, 100s and 1,000s Add up to two 4-digit numbers – no exchange • Add two 4-digit numbers – one exchange Add two 4-digit	• What is area? • Count squares • Make shapes Compare areas	• Multiples of 3 • Multiply and divide by 6 • 6 times-table and division facts • Multiply and divide by 9

	• Flexible partitioning of numbers to 10,000 Find 1, 10, 100, 1,000 more or less • Number line to 10,000 • Estimate on a number line to 10,000 Compare numbers to 10,000 • Order numbers to 10,000 • Roman numerals • Round to the nearest 10 • Round to the nearest 100 • Round to the nearest 1,000 • Round to the nearest 10, 100 or 1,000	numbers – more than one exchange • Subtract two 4-digit numbers – no exchange • Subtract two 4-digit numbers – one exchange • Subtract two 4-digit numbers – more than one exchange • Efficient subtraction • Estimate answers • Checking strategies		• 9 times-table and division facts • The 3, 6 and 9 times-tables • Multiply and divide by 7 • 7 times-table and division facts • 11 times-table and division facts • 12 times-table and division facts • Multiply by 1 and 0 • Divide a number by 1 and itself • Multiply three numbers
Sentence Stems	• There are ___ hundreds ____ tens and ____ ones. • The number is _____ • The difference in value between the start and end of the number line is _____ • • The next multiple of 1,000 is _____ • The previous multiple of 1,000 is _____ • 1 thousand is equal to ___ hundreds, so ____ thousands is equal to _____ hundreds. • thousands can be written in numerals as _____	• • The next/previous multiple of 10/100/1,000 is_____ • • I can partition _____ into ____ and ____ because . . . The value of the _____… column will increase/decrease by _____ • ____ ones added to ____ ones is equal to _____ ones. • I have ___ ones so I do/don't need to make an exchange. • ____ ones added to ____ plus _____ ones is equal to _____ ones. plus the 1 that I exchanged from the last column is equal to _____.	• The area of ____ is _____. • Area is the amount of ___ taken up by a 2D shape or surface. • Area can be measured using _____. • There are ___ squares inside the shape. • There are ___ rows. Each row has ___ squares. • I can make the shape different by _____. • The more squares in the shape, the ____ the area.	• • The next multiple of 3 is ____ • The multiple of 3 before ____. • I know ____ is a multiple of 3 because … • 6 lots of ____ is _____ • ____ shared into 6 equal groups is _____ • Multiplying by 6 is the same as multiplying by ___ twice. • ____ X 6 = double ____ X 3

National Curriculum Statements	Count in multiples of 6, 7, 9, 25 and 1000. Find 1000 more or less than a given number. Count backwards through zero to include negative numbers. Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones). Order and compare numbers beyond 1000 identify, represent and estimate numbers using different representations. Rround any number to the nearest 10, 100 or 1000. Solve number and practical problems that involve all of the above and with increasingly large positive numbers. Read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.	Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Estimate and use inverse operations to check answers to a calculation. Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.	Find the area of rectilinear shapes by counting squares.	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 three 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 one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.
Misconceptions	• Children may write numbers incorrectly, for example 421 as 400201 • Children may not understand the place value of each digit in a number. • Children may not use placeholders appropriately. • Children may not recognise the value of a place value counter correctly, because different place value counters are identical in size. Children may not correctly assign place value to each digit of a number. For example, they may write 423 = 4 + 2 + 3 Children may say that 423 has 20 tens rather than 2 tens, because they confuse place value language. • Children may count the number of divisions, rather than the intervals. • Support may be needed to work out the midpoint of an interval. • Children may assume the increments on the number line are each worth one unit, focusing solely on the starting number. • Children may not appreciate that 1,000 is 10 times the size of 100 • When they are meant to be counting in 1,000s, children may count in	• Children may identify the incorrect place value column, particularly if they are using plain counters in a place value chart, for example 3,469 – 300 = 469 or 3,439 • Confusion may arise with zero as a placeholder. • Children may find crossing the next or previous multiple challenging. • Children may not line up the digits in the place value columns correctly. • Children may assume they should start adding from left to right. Be careful as this may appear to be a good strategy given there are no exchanges required in this small step. • Children may not use zero as a placeholder when there are no hundreds, tens or ones. • Children may not line up the digits in the place value columns correctly. • Children may not add up from the smallest value column, and so will not be able to exchange correctly. • Children may not use zero as a placeholder when there are no hundreds, tens or ones.	• When investigating area for the first time, children may not use a reliable method or unit to count how much space is taken up. • When using sticky notes to practically investigate area, children may overlap them. This is a good opportunity to discuss the importance of measuring accurately. • Children may miscount when counting the squares of more complex shapes. • If children are insecure with their times-tables, they may make mistakes when using arrays to find the area. • Children may not know that rectilinear shapes need to be touching along the sides, not just at the corners. • When making rectilinear shapes with concrete resources, children may overlap the squares.	• Children may think that any number with 3 ones is a multiple of 3 • An early mistake when counting in 3s will affect all subsequent multiples. • Children may always begin counting from 3 to find a larger multiple of 3, when they could use the multiples they already know to find the new information. • Children may always start at 1 × 6 = 6 and recite the times-table, rather than use the number facts they know to find the facts they are not as secure with. • When writing fact families, children may follow the pattern from multiplication and see division as commutative, for example writing 42 ÷ 6 = 7 so 6 ÷ 42 = 7

	the more familiar 100s. When using blank counters on a place value chart, children may not make the connection between the column and the value of the counter.			
Progression	**Year 3:** • counts in 1000s • 1000s, 100s, 10s and 1s • partitioning • number line to 10000 • 1000 more or less • compare numbers • order numbers • round ot the nearest 1000 • counts in 25s • negative numbers • roman numerals to 100 hundreds, tens, counting, compare, order, represent, more than, less than, recombine, partition, numerals rounding', 'round up' and 'round down' • Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other threedigit multiples of 10. • Recognise the place value of each digit in three-digit numbers, and compose and decompose three-digit numbers using standard and non-standard partitioning • Reason about the location of any threedigit number in the linear number system, including identifying the previous and next multiple of 100 and 10. • Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts. **Year 5:** • Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10	**Year 3**: • Calculate complements to 100. • Add and subtract up to three-digit numbers using columnar methods. • Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part-part-whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction. **Year 5:** • add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) • add and subtract numbers mentally with increasingly large numbers • 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.	**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:** • 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

	times the size of0.01. • Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning. • Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. • Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts. • Convert between units of measure, including using common decimals and fractions.			written method. • Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context
Key Vocabulary	units, ones, tens, hundreds, thousands ten thousand, hundred thousand, million digit, one-, two-, three- or four-digit number, numeral, 'teens' number, place, place value, stands for, represents exchange, the same number as, as many as equal to, Of **two** objects/amounts: >, greater than, more than, larger than, bigger than, <, less than, fewer than, smaller than, Of **three** or more objects/amounts:, greatest, most, largest, biggest, least, fewest, smallest one… ten… one hundred… one thousand more/less, compare, order, size first… tenth… twentieth, last, last but one before, after, next, between, half-way between, guess how many, estimate nearly, roughly, close to, about the same as approximate, approximately, just over, just under, exact, exactly, too many, too few, enough, not enough, round (up or down), nearest, round to the nearest ten, round to the nearest hundred, integer, positive, negative, above/below zero, minus	add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? subtract, subtraction, take (away), minus,, decrease, leave, how many are left/left over?, difference between half, halve, how many more/fewer is… than…? how much more/less is…? equals, sign, is the same as tens boundary, hundreds boundary inverse	area, covers, surface square centimetre (cm2)	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

*Red words are the newly taught vocabulary.