Whole School Maths Curriculum Overview: Year 5

#TheSmawthorneExperience

Year 5	Autumn Term			
Topic	Place Value	Addtion and subtraction	Multiplication and division A	Fractions A
The Big Ideas	Large numbers of six digits are named in a pattern of three: hundreds of thousands, tens of thousands, ones of thousands, mirroring hundreds, tens and ones. It is helpful to relate large numbers to real-world contexts, for example the number of people that a local sports arena can hold.	Before starting any calculation is it helpful to think about whether or not you are confident that you can do it mentally. For example, 3689 + 4998 may be done mentally, but 3689 + 4756 may require paper and pencil. Carrying out an equivalent calculation might be easier than carrying out the given calculation. For example 3682 – 2996 is equivalent to 3686 – 3000 (constant difference).	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 = 36/18 = 2; 18/36 = 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.
Key Knowledge and Skills	• Roman numerals to 1,000 • Numbers to 10,000 • Numbers to 100,000 • Numbers to 1,000,000 • Read and write numbers to 1,000,000 • Powers of 10 • 10/100/1,000/10,000/100,000 more or less • Partition numbers to 1,000,000 • Number line to 1,000,000 • Compare and order numbers to 100,000 • Compare and order numbers to 1,000,000	• Mental strategies • Add whole numbers with more than four digits • Subtract whole numbers with more than four digits • Round to check answers • Inverse operations (addition and subtraction) • Multi-step addition and subtraction problems • Compare calculations • Find missing numbers	• Multiples • Common multiples • Factors • Common factors • Prime numbers • Square numbers • Cube numbers • Multiply by 10, 100 and 1,000	• Find fractions equivalent to a unit fraction • Find fractions equivalent to a non-unit fraction • Recognise equivalent fractions • Convert improper fractions to mixed numbers • Convert mixed numbers to improper fractions • Compare fractions less than 1 • Order fractions less than 1 • Compare and order fractions greater than 1

	• Round to the nearest 10, 100 or 1,000 • Round within 100,000 • Round within 1,000,000			• Add and subtract fractions with the same denominator • Add fractions within 1 • Add fractions with total greater than 1 • Add to a mixed number • Add two mixed numbers • Subtract fractions • Subtract from a mixed number • Subtract from a mixed number – breaking the whole • Subtract two mixed numbers
Sentence Stems	• The letter ____ represents the number _____. • I know ____ is greater than ____ because _____. • The column before/after the ___ column is called the ____ column. • 10 can be exchanged for 1 ____. • The whole of the nmber is said/written as . . . . • There are in ____ hundreds in 1,000 and ____ thousands in _____. • _____ is the size of _____. • ___ more/less than ____ is _____. • The value of the ___ digit is ____.	• The sum of __ ones and ___ ones is ___ ones, so the sum of ___ thousands and ____ thousands is ___ thousands. • I can partition the number into _____, _____ and ____ and add the parts seperately.	• A multiple is the result of multiplying a number by __. • The first multiple of a number is always _____. • ____ is a multiple of ____ because ____ X ____ = __ •	• 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. same as (decimal). • The fraction 15/1000 is the same as 0.015.

National Curriculum Statements	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. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero. 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. Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	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.	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 (nonprime) numbers. Establish whether a number up to 100 is prime and recall prime numbers up to 19. 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	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 = 15 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
Misconceptions	Children may think that numbers such as 990 can be written as XM instead of CMXC. • Children may not yet have fully grasped placeholders, for example reading 208 as twenty-eight. • Children may rely on the column method of addition and subtraction when this is not necessary. • Children may not use, or may misplace, the comma when writing numbers greater than or equal to 1,000 • Children are likely to use "thousands" and "millions" in everyday speech more often than "tens of thousands" or "hundreds of	Children need to be fluent in their knowledge of number bonds to support the mental strategies. • Children may not line up the numbers in the columns correctly. • Children may write the exchanged digits in the wrong column(s). • Children who are not secure in their number bonds may make numerical errors within columns. • Children may always subtract the smaller digit from the larger digit instead of making an exchange when needed. • The need for repeated exchanges may cause difficulty. When using the column method, children may arrange the numbers	• Children may confuse factors and multiples. • Errors may be made with times-tables facts. • Children may omit the number itself when listing multiples. • Children may find it more difficult to identify and find multiples that go beyond the facts in the 12 times-table.	• Children may not understand that different fractions that represent the same amount are equivalent, for example 1 3 and 2 6 • Children may over-generalise to "do the same to the numerator and denominator" and use incorrect additive instead of multiplicative relationships, for example 1 4 = 2 5 because 1 + 1 = 2 and 4 + 1 = 5 • Children may not understand that different fractions that represent the same amount are equivalent, for example 2 3 and 4 6 • Children may

	thousands", so they may miss out place value columns in between. • Children may find numbers with several placeholders difficult, for example 40,020 • Children may find it difficult to conceptualise such large numbers as they lie outside their everyday experience and cannot easily be represented concretely. • Unless they are confident with the previous step, children may think that place value columns go in the order ones, tens, hundreds, thousands, millions. • Children who find the "teen" numbers difficult may have problems with numbers such as 317,413 • Children may find reading and writing numbers with placeholders (for example, 700,011) difficult. Children may not realise that the overall effect of, for example, × 10 followed by × 10 is × 100	incorrectly. • Children may need support in deciding to what degree of accuracy they should round given numbers. • If children have any difficulties or misconceptions with rounding this will hold them back when estimating. • Children may see addition and subtraction as separate operations and not appreciate the connection between them. • Children may think that subtraction is commutative.		over-generalise to "do the same to the numerator and denominator" and use incorrect additive instead of multiplicative relationships, for example 3 4 = 4 5 because 3 + 1 = 4 and 4 + 1 = 5 • Errors may occur in finding the common factors of the numerator and denominator. • Children may get confused when looking for the relationships between numerators and denominators. • Children may over-generalise to "do the same to the numerator and denominator" and use incorrect additive instead of multiplicative relationships, for example 3 4 = 4 5 because 3 + 1 = 4 and 4 + 1 = 5
Progression	• Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100 • Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and non-standard partitioning. • Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. • Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. • Divide 100 and 1,000 into 2, 4, 5 and 10 equal parts. Find unit fractions of quantities using known division facts	• Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100 • Recognise the place value of each digit in four-digit numbers, and compose and decompose four-digit numbers using standard and non-standard partitioning. • Reason about the location of any four-digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. • Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. • Divide 100 and 1,000 into 2, 4, 5 and 10 equal parts. Find unit fractions of	Year 4: • 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 100 • identify, represent and estimate numbers using different representations • round 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	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

	(multiplication tables fluency). • Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10 or 100) Year 6: • Solve multiplication problems that have the scaling structure, such as 'ten times as long'. Understand that per cent relates to'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal fraction • Compare and order numbers, including those with up to 2 decimal places. Add and subtract using mental and formal written methods. • Compare and order numbers, including those with up to 2 decimal places. Estimate and approximate to the nearest 1 or 0.1. • Read scales on graphs and measuring instruments.	quantities using known division facts (multiplication tables fluency). • Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10 or 100) Year 6: • Solve multiplication problems that have the scaling structure, such as 'ten times as long'. Understand that per cent relates to'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal fraction • Compare and order numbers, including those with up to 2 decimal places. Add and subtract using mental and formal written methods. • Compare and order numbers, including those with up to 2 decimal places. Estimate and approximate to the nearest 1 or 0.1. • Read scales on graphs and measuring instruments.	changed to include the concept of zero and place value. Year 6: • Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). • Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding. • Solve problems with 2 unknowns • Solve problems involving ratio relationships.	reasoning and common denomination as a comparison strategy.
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 ³, greater than or equal to ², less than or equal to Of **three** or more objects/amounts: greatest, most, largest, biggest, least, fewest, smallest, one… ten… one hundred… one thousand more/less, compare, order, size, ascending/descending order, 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, Å, is	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, units boundary, tenths boundary, inverse	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, %

	approximately equal to , just over, just under, exact, exactly, too many, too few, enough, not enough, round (up or down), nearest, round to the nearest ten/hundred, round to the nearest thousand, integer, positive, negative, above/below zero, minus			

*Red words are the newly taught vocabulary.