Whole School Maths Curriculum Overview: Year 6

#TheSmawthorneExperience

Year 6	Spring Term					
Topic	Ratio	Algebra	Decimlas	FDP	Perimeter, area and volume	Statistics
The Big Ideas	It is important to distinguish between situations with an additive change or a multiplicative change (which involves ratio). For example, if four children have six sandwiches to share and two more children join them, although two more children have been added, the number of sandwiches then needed for everyone to still get the same amount is calculated multiplicatively.	A linear sequence of numbers is where the difference between the values of neighbouring terms is constant. The relationship can be generated in two ways: the sequence-generating rule can be recursive, i.e. one number in the sequence is generated from the preceding number (e.g. by adding 3 to the preceding number), or ordinal, i.e. the position of the number in the sequence generates the number (e.g. by multiplying the position by 3, and then subtracting 2). Sometimes sequence generating rules that seem different can generate the same sequence: the ordinal rule 'one more than each of the even numbers, starting with 2' generates the same sequence as the	Fractions express a relationship between a whole and equal parts of a whole. Pupils 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 journey has Tom travelled?' the pupil might respond, 'Tom has travelled two thirds of the whole journey.' Equivalent fractions are connected to the idea of ratio: keeping the numerator and denominator of a fraction in the same proportion creates an equivalent fraction. Putting fractions in place on the number lines helps understand fractions as numbers in their own right.		To read a scale, first work out how much each mark or division on the scale represents. The unit of measure must be identified before measuring. Selecting a unit will depend on the size and nature of the item to be measured and the degree of accuracy required.	Pie charts visually display relative proportions, for example, that the proportion of pupils at School A liking reading is greater than the proportion at School B.

		recursive rule 'start at 1 and add on 2, then another 2, then another 2, and so on'.				
Key Knowledge and Skills	• **Step 1** Add or multiply? • **Step 2** Use ratio language • **Step 3** Introduction to the ratio symbol • **Step 4** Ratio and fractions • **Step 5** Scale drawing • **Step 6** Use scale factors • **Step 7** Similar shapes	• **Step 1** 1-step function machines • **Step 2** 2-step function machines • **Step 3** Form expressions • **Step 4** Substitution • **Step 5** Formulae • **Step 6** Form equations • **Step 7** Solve 1-step equations	**Step 1** Place value within 1 **Step 2** Place value – integers and decimals **Step 3** Round decimals **Step 4** Add and subtract decimals **Step 5** Multiply by 10, 100 and 1,000 **Step 6** Divide by 10, 100 and 1,000 **Step 7** Multiply decimals by integers	**Step 1** Decimal and fraction equivalents **Step 2** Fractions as division **Step 3** Understand percentages **Step 4** Fractions to percentages **Step 5** Equivalent fractions, decimals and percentages **Step 6** Order fractions, decimals and percentages	**Step 1** Shapes - same area **Step 2** Area and perimeter **Step 3** Area of a triangle – counting squares **Step 4** Area of a right-angled triangle **Step 5** Area of any triangle **Step 6** Area of a parallelogram **Step 7** Volume - counting cubes	• **Step 1** Line graphs • **Step 2** Dual bar charts • **Step 3** Read and interpret pie charts • **Step 4** Pie charts with percentages • **Step 5** Draw pie charts • **Step 6** The mean

	• **Step 8** Ratio problems • **Step 9** Proportion problems	• **Step 8** Solve 2-step equations • **Step 9** Find pairs of values • **Step 10** Solve problems with two unknowns	**Step 8** Divide decimals by integers **Step 9** Multiply and divide decimals in context •	**Step 7** Percentage of an amount – one step **Step 8** Percentage of an amount – multi-step **Step 9** Percentages – missing values •	**Step 8** Volume of a cuboid •	
Sentence Stems	• Ratio Ratios shows the relationship between two amounts. For every (number/ item) there are (number/ item). • For every 3 red cubes there are 2 yellow cubes. 10 The notation of a ratio relates to the order of the parts. The ratio of (item) to (item) is (number) : (number). • The ratio of red counters to blue	• If the input is , the output is • If I know the output, I need to … • If the input is and the output is function is • First, I am going to • If the input is • The inverse of , then I am going to , then the output is then is ____ • • more than x can be written as + • If I have +	• "The digit in the tenths place represents..." • "The digit in the hundredths place represents..." • "This number has _____ ones, _____ tenths, and _____ hundredths." • "The value of the digit _____ in the number _____ is _____." • "This decimal can be written as a fraction with a denominator of _____." • 2. Comparing and Ordering Decimals: • "_____ is larger/smaller than _____ because..." • "_____ tenths is equivalent to _____ hundredths." • "_____ is greater than _____ by _____." • "When comparing _____ and _____, the _____ digit is the same, but the _____ digit is different."	• The perimeter of this shape is • calculated by...calculated by... • calculated by... • I can find the perimeter by • adding the lengths of all sidesadding the lengths of all sides • adding the lengths of all sides • The unit for perimeter is • linear, such as cm or mlinear, such as cm or m • linear, such as cm or m • .	• "The data shows that..." • "The highest value in the data set is..." • "The lowest value in the data set is..." • "The most frequent value is..." • "The data is spread out between..." • "There is a trend of..." • "The average (mean) is.

	counters is 1 : 2. Scale Factor (item) is (number) times as big as (item). • Shape A is 2 times as big as shape B.	= 3 × x and I add/subtract x altogether.	• "The decimal _____ is in between _____ and _____."		•
National Curriculum Statements	• solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts • solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison • solve problems involving similar shapes where the scale factor is known or can be found • solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	• use simple formulae generate and describe linear number sequences • express missing number problems algebraically • find pairs of numbers that satisfy an equation with two unknowns • enumerate possibilities of combinations of two variables.	identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places • multiply one-digit numbers with up to two decimal places by whole numbers • use written division methods in cases where the answer has up to two decimal places • solve problems which require answers to be rounded to specified degrees of accuracy • recall and use equivalences between simple fractions, decimals and percentages, including in different contexts	convert between miles and kilometres • recognise that shapes with the same areas can have different perimeters and vice versa • recognise when it is possible to use formulae for area and volume of shapes • calculate the area of parallelograms and triangles • calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].	• interpret and construct pie charts and line graphs and use these to solve problems • calculate and interpret the mean as an average.

Misconceptions	• Children may see just additive relationships and not notice the multiplicative relationships. • Children may not start double number lines from zero. • When using double number lines, children may focus on the horizontal relationships and not notice the vertical relationships. Children may use additive rather than multiplicative relationships to make comparisons, for example "There is one more blue than red." • Children may not understand the meaning of the ratio symbol, and may confuse it with a decimal point. • When simplifying a ratio, children may try to use additive rather than multiplicative relationships.	• Children may carry out the function on the output when working out the missing input, rather than using the inverse operation. • Children may find a function that works for some of the numbers given, but not all. • Children may not follow the order of the functions, and it is important to explore the effect this can have. • When finding the input, children may do the inverse of the f irst function first. • Children may assume that certain letters always represent specific numbers, for example a means 1, b means 2, c means 3 and so on.	• Children may confuse the words "thousand" and "thousandth", "hundred" and "hundredth", and "ten" and "tenth". • Children may confuse the words "thousand" and "thousandth", "hundred" and "hundredth", and "ten" and "tenth". • Children may use the incorrect number of placeholders, and so write the incorrect number. • The phrase "round down" can lead children to round too low, for example rounding 6.923 down to 6.91 rather than 6.92	• If children are not confident finding equivalent fractions, they may find converting more complex fractions to decimals difficult. • Children may be comfortable with the idea of finding a common denominator of 100, but struggle with examples that do not lend themselves to this strategy, for example 1 8 • Children may interpret the division the wrong way around, for example 4 5 as 5 ÷ 4 rather than 4 ÷ 5 • Children may need support to use extra zeros as placeholders when dividing, to avoid errors such as 3 ÷ 4 = 0.7 remainder 2	• Children may confuse area and perimeter. • When counting squares, children may miscount or use inefficient strategies. • Children may confuse area and perimeter. • When finding the area of a rectilinear shape, children may not split the shape in the most efficient way. • When calculating the perimeter, children may not use efficient strategies, instead relying on adding lengths in order. • Children may count half squares as full squares. • Without an efficient method, children may not count squares accurately. • Children may find it difficult to draw a triangle with a specific area.	• When drawing their own line graphs, children may need support to choose appropriate scales. • When there is more than one line on a graph, children may use the wrong line. • Children may only read one of each of the pairs of bars. • Children may combine the pairs of bars and find a total, than National Curriculum links rather than considering them separately. • Support may be needed to estimate from scales. • Children may need a reminder of how to work out fractions of amounts.
Progression	Only taught in Year 6.	Only taught in Year 6.	• 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	Year 5: • 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	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	Year 5: • solve comparison, sum and difference problems using information presented in a line graph • complete, read and interpret information in tables, including timetables

			up to three decimal places • solve problems involving number up to three decimal places • 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.	those fractions with a denominator of a multiple of 10 or 25.	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. • 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 • solve problems involving converting between units of time • use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. • estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water]	

Key Vocabulary	ratio, ratio notation, 1 : 2 proportion part, whole, total group fraction unequal, equal simplest form, simplify for every x there are y similar enlarge, enlargement scale, map scale, scale	pattern, growing pattern sequence rule term algebra, algebraic expression formula, formulae substitute generalise operation calculation, calculate equation inverse solution represent value	per cent (%), percentage parts, whole decimal fraction, equivalent fraction, tenth, hundredth, half, quarter less than (<), greater than (>) divide (÷), share, multiply (×) convert, compare, order, simplify hundredths, thousandths factor, multiple, product group, share numerator, denominator convert, simplify, equivalent divisor, dividend, quotient, remainder multiply (×), divide (÷) decimal placeholder place value, tenths,	millimetres (mm), centimetres (cm), metres (m), kilometres (km), grams (g), kilograms (kg), millilitres (ml), litres (l) inches (in), feet ( ), ounces (oz), pounds (lbs), pints, miles, gallons, yards digits, decimal conversion table, conversion graph. perimeter, distance, area, space, volume centimetres (cm), metres (m), square centimetres (cm2), square metres (m2), cubic centimetres (cm3), cubic metres (m3) rectangle, square, triangle, rectilinear shape, sides, length, width, parallelogram, cube, cuboid measure, combine, total,	average, mean, set, share pie chart, segment, whole, section, degree, angle, right angle tally chart, bar chart fraction, percentage line graph, axis/axes, estimate, accurate, interpret, increase, above, below, zero (0), value, x-axis, y-axis, minus (–), between, plot, point, vertical, horizontal, construct, convert/conversion, straight, equivalent, predict, curve more, equal, even, size, total, share, great(er/est),