Curriculum Map for Year 6 2018-2019

REMEMBER FLUENCY, REASONING, PROBLEM SOLVING AS WELL AS CONTENT

Autumn Term 14 weeks 6 + 8		Spring Term 12 weeks 6 + 6		Summer Term 12 weeks 5 + 7	
2 weeks	The number system and place value and properties of number	1 week	The number system and decimal numbers	1 week	Revision Number and calculating
2 weeks	Calculating all 4 ops	2 weeks	Calculating +, - , x and /	1 week	Revision FDP
2 weeks	Fractions	1 week	Algebra	1 week	Revision Geometry, Measure and Statistics
		1 week	Measure – area, perimeter and volume	SATS WEEK	
				1 weeks	Transition project Spirals
		1 week	Fractions		
HALF TERM		HALF TERM		HALF TERM	
3 weeks	SATs Assessment Complete Fractions Unit Geometry – space	1 week	Revision and SATs assessment	3 weeks	Transition project Spirals Calculator Work Problem Solving Algebra
2 weeks	Statistics and percentages	2 weeks	Decimals and percentages		
1 week	Ratio and prop	1 week	Measure	3 weeks	Any areas of revision needed Investigations and cross-discipline problem solving
1 week	Measure	1 week	Geometry - space		
1 week	Decimals	1 week	Geometry – position and direction		

Year 6 Curriculum Map

AUTUMN TERM

Week	Objective	Additional info and guidance
Aut 1 **1** **2**	**Number and place value and properties of number** • read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • finding mystery numbers or marking them on differently scaled number lines. • round any whole number to a required degree of accuracy • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above • identify common factors, common multiples and prime numbers count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000 halving (this supports number line work by estimating where half way is)	Lots of different ways of looking at large numbers, look at Testbase for ideas on how to structure questions that probe understanding. Find and describe linear and non linear sequences Use factors and multiples to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 92 x 10). Common factors can be related to finding equivalent fractions. Multiplying and dividing by 10,100,1000 Not in Year 6 curriculum but well worth revisiting: *odd, even, square, factors, multiples* ***Roman numerals*** ***Read and write numbers to at least 10,,000,000 and determine the value of each digit (the significance of each digit's position)*** Noting the pattern of three digits and commas. Do lots of practice reading these numbers aloud, noting zero as a place holder. ***Round any whole number to a required degree of accuracy (numbers relative to each other)*** Partitioning using arrow cards, base ten and place value counters. Making numbers using digits cards. Partition numbers in different ways i.e. 12,256 = 10,000 + 2000 + 200 + 50 + 6 = 10,000 + 2,000 + 200 + 40 + 16 etc. Explore these patterns. Explore the idea of = as equivalence and balance using empty box partitions Review from Y4: Find 1000 more or less than a given number. Explore empty boxes on number lines, broken number squares (e.g. a cross shape or L shape) Ask questions such as 'how many 1,000s in 80,000?' to deepen understanding. ***Solve number and practical problems that involve all of the above.*** Solve empty box problems that rely on understanding of place value. Include problems with = and inequalities <> ***Identify common factors, common multiples and prime numbers.*** Investigate patterns in multiples and rules of divisibility. Investigate common factors. Venn or Carroll diagrams are a great way to do this. Use factor bugs as a key recall image. Split composite numbers into its prime factors.
Aut 1 **3**	**Addition, subtraction, multiplication and division**	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division

4	•solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why •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 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 numbers •use their knowledge of the order of operations to carry out calculations involving the four operations •solve problems involving addition, subtraction, multiplication and division •use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.	Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. This is not solely about formal methods to solve word problems – its about how numbers work together and how to be flexible in manipulating numbers, with a large emphasis on mental strategies / different ways of doing things, games and manipulating numbers – how could you do this? What is the best way? Why does this way work well? Good mathematicians are lazy – finding short cuts / quickest ways / most efficient strategies. Make explicit different mental strategies and how to increase efficiency (such as using number bonds, near doubles etc) . When is it quicker to take away and when is it quicker to count on (find difference). Use intelligent practice to build up complexity of calculations chn are required to do. Look at different examples – why is it hard? Why is it easy? E.g. 3010 – 1678 – why is this 'hard'? 6789 – 2345 – why is this 'easy'? Constantly need to be requiring chn to check their work (using inverse, estimations, is it sensible). Subtractions should always be checked with a column addition in case of 'classic' column subtraction errors. Work on resilience in problem solving – keep going until they know it is right – keep trying different things. Lots of emphasis on working systematically and methodically when tackling problems. Don't just limit to word problems – use Testbase for wider range of contexts / puzzles / problems. Use of bar modelling to interpret problems. ***Perform mental calculations, including with mixed operations and large numbers.*** Write calculations horizontally and tell children to assess whether mental methods will be quick and efficient. Use numbers which are close to each other where finding the difference mentally supported by number line jottings would be most efficient. Explore the rule 'if it's looking at you' find the difference e.g. 2,003 – 1,899. Find the difference between amounts of money that involve finding change, times and dates on time lines, mentally. Use the distributive and commutative law and find equivalent calculations or to manipulate calculations … this is an important mental skill i.e. 14 X 8 = 10 X 8 + 4 X 8. Find equivalent short multiplications for trickier long multiplications e.g. 16 X 17 = 8 X 34 Teach BIDMAS and explore the order of operations, and how it can alter the outcome of a calculation once we know the order. *Y5 Review: Add numbers with more than four digits (different amounts of digits and more than 2 numbers) using columnar addition* *Y5 Review: Subtract numbers with more than four digit numbers using compact columnar subtraction* Design calculations using intelligent practice and ensure they don't lend themselves to mental methods. *Y5 Review: Multiply numbers up to 4 digits by one digit (short multiplication) using the formal written method.* ***Multiply multi-digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication.*** Show expanded columnar multiplication next to grid method, examining the links. Show expanded columnar method next to compact multiplication, examining the links. Explore misconceptions e.g. 500 X 8 within a grid is often mistakenly recorded as 400 rather than 4,000 *Use estimation (inverse and rounding) to check answers and determine, in the context, appropriate degree of accuracy.* ***Divide numbers up to 4 digits by a two digit number (Y5 review: by a one digit number) and interpret remainders as whole number remainders, fractions or by rounding as appropriate for the context.***

	KS1 and LKS2 review: basic but still important! Mental addition strategies without counting on! **Calculate don't count and apply all these strategies to larger or decimal numbers**: Quick adds e.g. 20 + 7 then 23 + 6 'because I know 3 + 6 = 9'; Using bonds to 10; Partitioning single digit numbers in different ways to bridge 10 e.g. 27 + 5 = 27 + 3 + 2; Finding near doubles rather than adding e.g. 30 + 31; Adding nearly numbers like 19 by adding 20 and adjusting; Add strings of numbers by finding bonds and doubles. Reinforce law of commutativity for + so we don't have to do it from left to right!	***Use written division methods in cases where the answer has up to two dp.*** Explore why decimal remainders are so! e.g. 435 ÷ 6 = 72.5 = 72 ½ = 72 r3 Don't just teach decimal remainders automatically with no understanding! This is a great area for delving deeper. Explore remainders which are 0.33333 0.125 0.25 and 0.75 Explore problems that require us to round up or down when there are remainders. ***Solve addition, subtraction, multiplication and division problems in contexts, deciding which operations should be used and why.*** ***Use estimation (inverse and rounding) to check answers and determine, in the context, appropriate degree of accuracy.*** ***Recognise and use inverse relationships and use this to check calculations and solve missing number problems.*** ***Use knowledge of the order of operations to carry out calculations involving the four operations.*** Write equations in different ways e.g. 2.3 = ? + 1.2 ; 4.3 + 2.5 = ? – 0.8; and 1,002 + 1,005 < ? – 2 but with larger or decimal numbers. Where there is more than one possible solution, explore what the largest or smallest could possibly be. Use bar models to show whole part-part inverse relationships and to help children decide which operation to carry out.
Aut 1 **5**	**Fractions**	Use equivalent fractions to add and subtract fractions with different denominators. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle.

Year 6 Curriculum Map

6 **(Aut 2 1/2)**	•use common factors to simplify fractions •use common multiples to express fractions in the same denomination •compare and order fractions, including fractions > 1 •add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions •multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, × =] •divide proper fractions by whole numbers [for example, ÷ 2 =] •associate a fraction with division and calculate decimal fraction equivalents for a simple fraction [for example, 0.375 =] Review from Year 4: Count in fractional steps starting from any number and using different fraction families i.e. 1/5 family or ¼ family. Explore equivalence as you go. Use a counting stick to count in 1/3s beyond 1 whole! Discuss equivalence and improper fractions how else could we say 4/3? Find rules and missing fractions in sequences.	Work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if of a length is 36cm, then the whole length is 36 × 4 = 144cm). **The Number System: Fractions *as* numbers** *LKS1 Review: Recognise and show, using diagrams, families of common equivalent fractions* Review equal and unequal pieces and understanding of families of fractions whose denominators have a common factor. Use fraction cards. *Equivalence* *Y5 Review: Recognise mixed numbers and improper fractions and convert from one form to the other. Write mathematical statements >1 as a mixed number for example 2/5 + 4/5 = 6/5 = 1 1/5* ***Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.*** ***Compare and order fractions, including fractions > 1.*** ***Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.*** Find fractions of shapes linking to equivalence e.g. If you have 3/6 shaded on a shape, this is the same as ½. Extend this to tenths and hundredths. Discuss the term 'simplest form' and how you need to find the lowest denominator to do so. Use and build fraction walls showing equivalence between families. Use fraction cards to explore equivalence within one family e.g. 1/3 1/6 1/12 Ensure enough visual models are used to support writing equivalences such as 4/10 = 40/100 including fraction cards, fraction walls, bar models, 100 grids representing one whole, or Numicon. ***Recall and use equivalence between simple fractions, decimals and percentages including in different contexts.*** Refer to work done on % in Y5, working with the tenth family. Make sure children know common equivalence e.g. 0.25 = 25% and 0.2 = 2/10 = 1/5 *Calculating with fractions* ***Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.*** Use fraction cards to add and subtract fractions within the same family, starting with those with the same denominator. These may tip over one whole into improper fractions and mixed numbers. https://www.ncetm.org.uk/resources/43609 Bar models are also useful for exploring addition and subtraction of fractions Y5 Review: *Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.* In this context, it can be useful to read the X symbol as 'of' e.g. 1/3 x 18 = 1/3 of 18 (this needs to be altered to '18 groups of 1/3' if it is written as 18 X 1/3. You could demonstrate how if we count up in 1/3s 18 times we will get to 9 whole ones. Explore lots of examples of this, drawing diagrams with the children to picture what is happening. This can also be modelled using Numicon where 1 whole = 3. Write related equations e.g. if we know ½ X 6 =3 then is 3 ÷ 6 = ½ ? This challenges misconceptions about x always making a bigger product **Fractions of numbers** *KS2 review: find non-unit fractions of numbers.* Bar models are fantastic for visualising fractions of numbers, and the inverse… 1/3 of the class were boys, there were 18 girls. How many boys were there? Not 6 but 9! Express problems using missing numbers including missing denominators or numerators. ***Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example ¼ X ½ = 1/8*** A form of grid method can be used to visualise this. Alternatively, saying 'of' in place of 'multiplied by' can make these simple. It is important that children grapple with this complex idea of using fractions as operators, rather than simply learning to multiply the denominators and the numerators… however, they should be encouraged to make this link and to test out the 'rule'. ***Divide proper fractions by whole numbers e.g. 1/3 ÷ 2 = 1/6*** If equivalence and understanding of fractions as numbers has been built in previous fraction lessons, splitting 1/3 in two should be able to be drawn, visualised etc. The inverse can also be applied e.g. 2 X 1/6 = 1/3 to check the calculation.
HALF TERM		

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Aut 2 **1**		***Sats assessment and revision***
Aut 2 **2** **3**	**Geometry – properties of shape** •draw 2-D shapes using given dimensions and angles •recognise, describe and build simple 3-D shapes, including making nets •compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons •illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius •recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles. Review 2D shape names and properties. Recognise and describe 3D shapes linked to their 2D faces.	Use conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, d = 2 × r; a = 180 – (b + c). ***Draw 2-D shapes using given dimensions and angles – geometric construction.*** Review the properties of 2D shapes and always require children to use correct geometric vocabulary. Review how to use a protractor and require accuracy in construction. These skills will help them with the reasoning required in the next two objectives… ***Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.*** ***Express missing number problems algebraically.*** There are two elements here. One is that children must be confident at estimating and measuring angles first, then the other is to use visualisation, reasoning and calculation to work out missing angles without measuring. The second is a deeper skill and requires lots of exploration through measuring first. Children must be familiar with missing angles being labelled algebraically. ***Illustrate and name the parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.*** Investigate the ratio between the diameter, circumference and the area of a circle. Children love pi! (Start Fractions if possible – see following unit so ready for Sats assessment after half term)
Aut 2 **4** **5**	**Statistics and percentages** •interpret and construct pie charts and line graphs and use these to solve problems •calculate and interpret the mean as an average. Counting in 10s 5s 20s 25s	Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set. Not in Year 6 curriculum but to be revisited: *pictographs, bar charts, tables* Importance of annotating onto charts as they work and being systematic and methodical. Chn must be just as rigorous in their calculating and checking with charts and graphs as in any other context – don't interpret the chart / graph correctly and then mess up the calculating!

	Finding missing numbers on scales and working out the intervals.	***Solve problems involving the calculation of percentages [e.g. of measures, and such as 15% of 360] and the use of percentages for comparison.*** The percentage 'cloud' lesson is essential here (and should have been taught in Y5). This requires children to find 10%, 1% and 50% of a number and then work from there, using these percentages as a basis for finding 20% (double 10%) or 95% (subtract 5%) etc. ***Recognise the per cent symbol and understand that % relates to 'number of parts per hundred'.*** ***Write percentages as a fraction with a denominator of 100 and as a decimal fraction.*** ***Solve problems which require knowing percentage and decimal equivalents of ½ ¼ 1/5 2/5 4/5 and those fractions with a denominator of 10 or 25.*** 100 squares where each square represents 1% are a good starting image for this. It is also useful to discuss percentages in a real-life or colloquial context e.g. 'Have you given 100%?' or 'This price has 50% off!' Colour different percentages on a 100 square and find vulgar fraction and decimal equivalents, emphasising 'parts per 100'. Find simplified equivalents e.g. ½ = 50% = 50/100 = 25/50 All of the above focuses on percentages as a thing you can count out of 100. Now shift to percentages *of* numbers. Your whole can be anything! Create problems where children have to find 50% or 25% etc. of a number. Percentage clouds are a useful way of thinking about this. If you can find 50%, 10% and 1% of a number, you can build other percentages from these starting points. Prices and discounts are a useful context. Deepen understanding by asking inverse questions or missing number questions e.g. 25% of a number is 8, what's the number? ***Interpret pie charts and use these to solve problems. Construct pie charts.*** Ensure the idea of a pie chart showing 100% and representing different numbers is fully understood. Pose problems where two pie charts show different proportions <u>but</u> the totals are different so they need careful interpretation. i.e. 1/3 = 24 on one chart and ½ = 18 on the other! It is good to base statistics work on other science or geography lessons etc. to put it in context. However, constructing pie charts may require you to provide comfortable data. Excel or other statistics apps can be very useful as they automatically convert data into different charts and graphs.
Aut 2 6	**Ratio and proportion** •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	Pupils link percentages of 360° to calculating angles of pie charts. Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation *a*:*b* to record their work. Bar modelling *GARDEN* Solve ratio problems (recipes are a great context for this) relating to measures. ***Solve problems involving similar shapes where the scale factor is known or can be found.*** Children should scale shapes themselves and then work from scaled shapes to work out the scale factor. How does scaling the side length of a rectangle affect its area?

	•solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	
Aut 2 **7**	**Measure** •solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate •use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places •convert between miles and kilometres Multiply and divide numbers by 10 and 100 and 1000 Estimating where numbers should be placed on different number lines (scales) Find rules and missing numbers in multiplicative	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. Use place value understanding to convert between units of measure – practice x and / by 10, 100, 1000 as starters / games / warm ups. Use measure as opportunity to apply calculating skills. Use range of scales for chn to interpret – link with number lines. With any measures problem involving an unmarked scale, the first thing to do is work out the scale – can do this by trial and error, using a marked half way point if there is one, or dividing the interval by number of markers. ***Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 dp where appropriate.*** ***Use, read, write and convert between standard units, converting measurements of capacity, length, mass and volume using decimal notation.*** Focus on measuring capacity, mass and length accurately using practical equipment. Relate scales to a different type of number line and addition and subtraction methods used in the previous unit of work. Explore this under the banner of 'equivalence'. Compare and estimate different masses, lengths and capacities. Use measuring equipment to show equivalence on scales. E.g. show 0-1kg on a line next to 0-1,000g and find equivalences. Include scales and parts of scales which do not go from 0-1 … i.e. 3 – 4 kg next to a line of 3,000 – 4,000 g Solve ratio problems (recipes are a great context for this) relating to measures. Length and capacity are also common context that we find ourselves solving ratio problems. **One of the best methods of visualising ratio problems is the bar model. Investigate this and use it!** ***Convert between miles and kilometres*** Conversions are a great way to explore formulae and also combine ratio work. e.g. how many km = mile?

	sequences. (Not always horizontally… show sequences with circles and arrows between, for example. Include missing numbers on measuring scales too!)	
Aut 2 8	**The number system - Decimals** •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 Counting in decimals in small steps from 0.001 to 0.1	Use different models and images to explore decimals – counting sticks, number lines, and Dienes equipment where a flat represents 1 not 100. Constant links between fractions, decimals and percentages – being able to quickly convert between gives chn much more flexibility and options for solving problems. Relate decimals to money but use non money contexts as well. Two top tips: 'Make them look the same' – draw in the zeroes. 'Imagine its money' – link 0.01 to 1p, 0.1 to 10p – draw in the zeroes. Find complements to 1 e.g. 0.35 and 0.65. https://www.ncetm.org.uk/resources/42655 ***Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers to 3 d.p. (the significance of each digit's position)*** Placing on a number line (with different scales and starting points). Focus particularly on numbers greater than 1,000 as this is when children start to have problems visualizing. Use a number line to support rounding; this as a key image. Remember that number lines do not need to sit horizontally, or start at zero! Work on working out the size of the intervals, finding half way if that helps, positioning the number and then checking it makes sense. Teach away from the misconception that 36,800 is 7,000 rounded to the nearest thousand. Explore questions such as 'how many hundredths in a tenth?' 'How many thousandths in a tenth?' to deepen understanding. Explore 'zoomed in' number lines which break 1 into tenths, hundredths and then thousandths. Use base 10 to review learning from Y4 with one whole represented by a 100 slab, a tenth being a rod of ten and a hundredth being a small cube. We can't represent a thousandth… imagine this cube divided into 10 tiny pieces! Count up in 0.001 and show what happens after 0.009 as it becomes 0.01 etc. Use number lines with different starting points and different scales to place decimal numbers. Examine misconceptions about 0.011 or 0.11 etc

SPRING TERM

Week	Objective	Additional information and guidance
Spr 1 **1**	**The number system - Decimals** • use negative numbers in context, and calculate intervals across zero • solve number and practical problems that involve all of the above • identify common factors, common multiples and prime numbers Any other decimal revision still needed after last unit.	***Round any whole number to a required degree of accuracy (numbers relative to each other)*** Partitioning using arrow cards, base ten and place value counters. Making numbers using digits cards. Partition numbers in different ways i.e. 12,256 = 10,000 + 2000 + 200 + 50 + 6 = 10,000 + 2,000 + 200 + 40 + 16 etc. Explore these patterns. Explore the idea of = as equivalence and balance using empty box partitions Review from Y4: Find 1000 more or less than a given number. Explore empty boxes on number lines, broken number squares (e.g. a cross shape or L shape) Ask questions such as 'how many 1,000s in 80,000?' to deepen understanding. ***Solve number and practical problems that involve all of the above.*** Solve empty box problems that rely on understanding of place value. Include problems with = and inequalities <> ***Identify common factors, common multiples and prime numbers.*** Investigate patterns in multiples and rules of divisibility. Investigate common factors. Venn or Carroll diagrams are a great way to do this. Use factor bugs as a key recall image. Split composite numbers into its prime factors. **Sats assessment**
Spr 1 **2** **3**	**Addition, subtraction, multiplication and division** •solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why •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,	Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures. Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9. This is not solely about formal methods to solve word problems – its about how numbers work together and how to be flexible in manipulating numbers, with a large emphasis on mental strategies / different ways of doing things, games and manipulating numbers – how could you do this? What is the best way? Why does this way work well? Good mathematicians are lazy – finding short cuts / quickest ways / most efficient strategies. Make explicit different mental strategies and how to increase efficiency (such as using number bonds, near doubles etc) . When is it quicker to take away and when is it quicker to count on (find difference). Use intelligent practice to build up complexity of calculations chn are required to do. Look at different examples – why is it hard? Why is it easy? E.g. 3010 – 1678 – why is this 'hard'? 6789 – 2345 – why is this 'easy'? Use of bar modelling to interpret problems. *Autumn review:*

	or by rounding, as appropriate for the 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 numbers •use their knowledge of the order of operations to carry out calculations involving the four operations •solve problems involving addition, subtraction, multiplication and division •use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy. Chant and memorise weaker times tables. Create 'If I know this… I know that… 'statements to supersize numbers e.g. 6 X 7 = 42 so 6 X 70 = 420. Find rules and missing numbers in multiplicative/doubling or halving sequences. (Not always horizontally… show sequences with circles and arrows between, for example.)	*Perform mental calculations, including with mixed operations and large numbers.* *Use knowledge of the order of operations to carry out calculations involving the four operations.* *Solve addition, subtraction, multiplication and division multi-step problems in contexts, deciding which operations and methods to use and why.* Children may be very familiar with using + and – methods by now so spend longer on looking at and teaching away from errors, particularly in X and division. As you practice and use multiplication and division methods, you will simultaneously be rehearsing and recalling x table facts, rules of divisibility etc. Mental Maths (remember this can and should include jottings!) ***Find pairs of numbers that satisfy an equation with two unknowns.*** ***Enumerate possibilities of a combination of two variables*** It is very useful to look at this type of algebra when practising mental mathematics. It forms an investigative basis for mental arithmetic practice. e.g. 3g – w = 10 there are different possibilities for what g and w might represent. Here is a nice exploration of this with Numicon. ***Generate and describe linear sequences*** ***Describe positions on a full coordinate grid (all four quadrants)*** Investigate both term-to-term sequences e.g. adding 7 each time, and position to term sequences. Children need to be able to both describe the rule for a sequence algebraically, and to use a formula to generate terms. It is a great deepening exercise to plot terms of a sequence as a line graph and find the 'equation of the line'. Times tables can be useful for this. More Complex Multi-Step Calculations (combination of mental and written methods) ***Solve problems involving the calculation and conversion of units of measure using decimal notation up to 3 d.p. where appropriate.*** ***Solve problems which require answers to be rounded to specified degrees of accuracy.*** Time, timetables and money are useful contexts that have not been covered or used extensively in the Autumn term. They also lend themselves to mental jottings and the use of a number line to find the difference. Children should use all operations in combinations to solve word or other problems using measures or everyday situations as a context. Recalling calculation methods needs to be accurate and children must reason about their answer. Is it sensible? Does it match my estimation? Could I check with the inverse operation? Does it need to be rounded to a specified degree? If so, how? Does the answer require a fraction, decimal or percentage as an answer?

Year 6 Curriculum Map

Spr 1 4	**Algebra** •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.	Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: •missing numbers, lengths, coordinates and angles •formulae in mathematics and science •equivalent expressions (for example, $a + b = b + a$) •generalisations of number patterns •number puzzles (for example, what two numbers can add up to). Bar modelling
Spr 1 5	**Measure – area, perimeter and volume** •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].	Link finding area of other shapes to finding area of rectangles. Working backwards problems / missing information problems – e.g. the perimeter of a rectangle is 74cm, side a is 16cm, what are the other sides' lengths? Link with missing number problems and algebra. Different ways of finding area – counting squares, using formula. Remember that diagonal lines on a square grid do not equal 1 when finding perimeter. ***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.* All of this work is based on understanding how to find the area of rectilinear shapes. Investigate how area is related to perimeters and vice versa. Children can fold rectangles in half diagonally to find the link between the side lengths, the area of the rectangle and the area of the resulting right-angled triangle, thus finding that half (length x width) = area of the right angled triangle. They can cut an isosceles triangle in half from apex to base (its height) to form two halves of a rectangle, thus finding that half the height x length of the base = area. Lots of rich reasoning here! Children can then use similar cutting techniques to find the area of a parallelogram. ***Calculate, estimate and compare the volume of cubes and cuboids using standard units, including cubic centimetres and metres, and extending to other units [for example mm^3 and km^3]*** Investigate the relationship between area of a cube or cuboid's face and the volume. Review Y5 filling shapes to find the volume.

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Spr 1 6	**Fractions** •use common factors to simplify fractions •use common multiples to express fractions in the same denomination •compare and order fractions, including fractions > 1 •add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions •multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, × =] •divide proper fractions by whole numbers [for example, ÷ 2 =] •associate a fraction with division and calculate decimal fraction equivalents for a simple fraction [for example, 0.375 =]	Use equivalent fractions to add and subtract fractions with different denominators. This follows earlier work about fractions as operators (fractions of), as numbers, and as equal parts of objects, for example as parts of a rectangle. Work backwards by multiplying a quantity that represents a unit fraction to find the whole quantity (for example, if of a length is 36cm, then the whole length is 36 × 4 = 144cm). **The Number System: Fractions *as* numbers** <u>*Equivalence*</u> ***Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.*** ***Compare and order fractions, including fractions > 1.*** ***Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths.*** Find fractions of shapes linking to equivalence e.g. If you have 3/6 shaded on a shape, this is the same as ½. Extend this to tenths and hundredths. Discuss the term 'simplest form' and how you need to find the lowest denominator to do so. Use and build fraction walls showing equivalence between families. Use fraction cards to explore equivalence within one family e.g. 1/3 1/6 1/12 Ensure enough visual models are used to support writing equivalences such as 4/10 = 40/100 including fraction cards, fraction walls, bar models, 100 grids representing one whole, or Numicon. ***Recall and use equivalence between simple fractions, decimals and percentages including in different contexts.*** Refer to work done on % in Y5, working with the tenth family. Make sure children know common equivalence e.g. 0.25 = 25% and 0.2 = 2/10 = 1/5 <u>*Calculating with fractions*</u> ***Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions.*** Use fraction cards to add and subtract fractions within the same family, starting with those with the same denominator. These may tip over one whole into improper fractions and mixed numbers. https://www.ncetm.org.uk/resources/43609 Bar models are also useful for exploring addition and subtraction of fractions Y5 Review: *Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.* In this context, it can be useful to read the X symbol as 'of' e.g. 1/3 x 18 = 1/3 of 18 (this needs to be altered to '18 groups of 1/3' if it is written as 18 X 1/3. You could demonstrate how if we count up in 1/3s 18 times we will get to 9 whole ones. Explore lots of examples of this, drawing diagrams with the children to picture what is happening. This can also be modelled using Numicon where 1 whole = 3. Write related equations e.g. if we know ½ X 6 =3 then is 3 ÷ 6 = ½ ? This challenges misconceptions about x always making a bigger product **Fractions of numbers** ***Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example ¼ X ½ = 1/8*** A form of grid method can be used to visualise this. Alternatively, saying 'of' in place of 'multiplied by' can make these simple. It is important that children grapple with this complex idea of using fractions as operators, rather than simply learning to multiply the denominators and the numerators… however, they should be encouraged to make this link and to test out the 'rule'. ***Divide proper fractions by whole numbers e.g. 1/3 ÷ 2 = 1/6*** If equivalence and understanding of fractions as numbers has been built in previous fraction lessons, splitting 1/3 in two should be able to be drawn, visualised etc. The inverse can also be applied e.g. 2 X 1/6 = 1/3 to check the calculation.

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HALF TERM		
Spr 2 1	**Revision and SATs assessment**	
Spr 2 2 3	**The number system - Decimals** •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 Counting in decimals in small steps from 0.001 to 0.1	Use different models and images to explore decimals – counting sticks, number lines, and Dienes equipment where a flat represents 1 not 100. Constant links between fractions, decimals and percentages – being able to quickly convert between gives chn much more flexibility and options for solving problems. Relate decimals to money but use non money contexts as well. Two top tips: 'Make them look the same' – draw in the zeroes. 'Imagine its money' – link 0.01 to 1p, 0.1 to 10p – draw in the zeroes. Find complements to 1 e.g. 0.35 and 0.65. https://www.ncetm.org.uk/resources/42655 ***Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers to 3 d.p. (the significance of each digit's position)*** Placing on a number line (with different scales and starting points). Focus particularly on numbers greater than 1,000 as this is when children start to have problems visualizing. Use a number line to support rounding; this as a key image. Remember that number lines do not need to sit horizontally, or start at zero! Work on working out the size of the intervals, finding half way if that helps, positioning the number and then checking it makes sense. Teach away from the misconception that 36,800 is 7,000 rounded to the nearest thousand. Explore questions such as 'how many hundredths in a tenth?' 'How many thousandths in a tenth?' to deepen understanding. Explore 'zoomed in' number lines which break 1 into tenths, hundredths and then thousandths. Use base 10 to review learning from Y4 with one whole represented by a 100 slab, a tenth being a rod of ten and a hundredth being a small cube. We can't represent a thousandth… imagine this cube divided into 10 tiny pieces! Count up in 0.001 and show what happens after 0.009 as it becomes 0.01 etc. Use number lines with different starting points and different scales to place decimal numbers. Examine misconceptions about 0.011 or 0.11 etc.

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Spr 2 4	**Measure** •solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate •use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places •convert between miles and kilometres	Pupils connect conversion (for example, from kilometres to miles) to a graphical representation as preparation for understanding linear/proportional graphs. They know approximate conversions and are able to tell if an answer is sensible. Using the number line, pupils use, add and subtract positive and negative integers for measures such as temperature. ***Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 dp where appropriate.*** ***Use, read, write and convert between standard units, converting measurements of capacity, length, mass and volume using decimal notation.*** Focus on measuring capacity, mass and length accurately using practical equipment. Relate scales to a different type of number line and addition and subtraction methods used in the previous unit of work. Explore this under the banner of 'equivalence'. Compare and estimate different masses, lengths and capacities. Use measuring equipment to show equivalence on scales. E.g. show 0-1kg on a line next to 0-1,000g and find equivalences. Include scales and parts of scales which do not go from 0-1 … i.e. 3 – 4 kg next to a line of 3,000 – 4,000 g Solve ratio problems (recipes are a great context for this) relating to measures. Length and capacity are also common context that we find ourselves solving ratio problems. **One of the best methods of visualising ratio problems is the bar model. Investigate this and use it!** ***Convert between miles and kilometres*** Conversions are a great way to explore formulae and also combine ratio work. e.g. how many km = mile?
Spr 2 5	**Geometry – properties of shape** •draw 2-D shapes using given dimensions and angles •recognise, describe and build simple 3-D shapes, including making nets •compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons •illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius •recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	Use conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 – (b + c)$. ***Draw 2-D shapes using given dimensions and angles – geometric construction.*** Review the properties of 2D shapes and always require children to use correct geometric vocabulary. Review how to use a protractor and require accuracy in construction. These skills will help them with the reasoning required in the next two objectives… ***Recognise angles where they meet at a point, are on a straight line, or are vertically opposite and find missing angles.*** ***Express missing number problems algebraically.*** There are two elements here. One is that children must be confident at estimating and measuring angles first, then the other is to use visualisation, reasoning and calculation to work out missing angles without measuring. The second is a deeper skill and requires lots of exploration through measuring first. Children must be familiar with missing angles being labelled algebraically. ***Illustrate and name the parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.*** Investigate the ratio between the diameter, circumference and the area of a circle. Children love pi!

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Spr 2 6	**Geometry – Position and Direction** •describe positions on the full coordinate grid (all four quadrants) •draw and translate simple shapes on the coordinate plane, and reflect them in the axes.	Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to (a – 2, b + 3); (a, b) and (a + d, b + d) being opposite vertices of a square of side d.

Summer Term

Week	**Objective** Any mental maths to develop fluency and confidence. Mental maths papers (though not used now) are useful for spotting gaps and building speed as part of revision.	**Additional info and guidance**
Sum 1 1	REVISION NUMBER AND CALCULATING	Go through Testbase topic list to ensure everything has been covered. The rest of your teaching will be driven by gap analysis using your own school assessments or previous SATs questions; and what you know about the children. Key areas to be repeated may be: - rapid recall of multiplication and division facts - answering questions about number sequences presented in different ways - missing number equations that require mental calculation - applying the four operations to multi-step problems. - finding fractions (%, vulgar and decimals) of numbers - calculating with fractions (both pure arithmetic and in contexts) - answering questions about place value (including decimal and vulgar fractions) calculating with measures and finding missing angles
Sum 1 2	REVISION FRACTIONS AND GEOMETRY	
Sum 1 3	REVISION MEASURE AND STATISTICS	
Sum 1 4	**SATS WEEK**	
Sum 2 5	Transition project Spirals Lancs (http://www.lancsngfl.ac.uk/secondary/math/index.php?category_id=817)	
HALF TERM		

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Sum 2 **1** **2** **3**	**Statistics** •interpret and construct pie charts and line graphs and use these to solve problems •calculate and interpret the mean as an average. **Algebra** •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.	Finish spirals transition unit then… Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set. Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: •missing numbers, lengths, coordinates and angles •formulae in mathematics and science •equivalent expressions (for example, $a + b = b + a$) •generalisations of number patterns •number puzzles (for example, what two numbers can add up to). Bar modelling
Sum 2 **4** **5** **6**	Investigations Link to real-world maths Problem solving with a mix of objectives and foci Any revision of units still needed before secondary	