Mathematics Journey Planner: Year 5

OVERVIEW & BIG IDEAS					
AUTUMN		**SPRING**		**SUMMER**	
3 weeks	**The Number System: big and small numbers** The value of a digit is determined by its position. Place value must be explored in terms of the value of each digit (additive partitioning) and its overall value, as well as its position relative to other numbers. Large numbers are named in patterns of 3. The number of digits in a number does not necessarily make it larger or smaller e.g. 0.35 < 0.5	**2 weeks**	**The Number System: big *or* small numbers; negative numbers** The value of a digit is determined by its position in a number. Place value must be explored in terms of the value of each digit (additive partitioning) and its overall value, as well as its position relative to other numbers. Large numbers are named in patterns of 3. The number of digits in a number does not necessarily make it larger or smaller e.g. 0.35 < 0.5	**2 weeks**	**The Number System: decimal fractions** Decimals are an extension of our whole number system. Decimals are a type of fraction. The number of digits in a number does not necessarily make it larger or smaller e.g. 0.35 < 0.5
3 weeks	**Calculating, Patterns & Algebra + and –** Can you do it mentally? The big idea is using a whole-part model to picture addition and subtraction. Drawing bar models will help to picture which operation to do. Rounding can help to get a sense of the size of the answer or to find an equivalent calculation, then adjust. Numbers should be looked at before a method is chosen to decide which will be most efficient.	**4 weeks**	**Calculating X and ÷; Patterns & Algebra; Measures** In Y5, the key is to understand the links between factors, multiples, composite and prime numbers, rather than seeing these as separate facts to be learnt. Links should be developed using scaling: If I know… I also know… They must also see how fractions are connected to division. Converting measures is about equivalence and requires scaling by 10, 100 etc. Children develop benchmarks for different measures e.g. the capacity of a mug, to help estimate.	**4 weeks**	**Calculating, Patterns & Algebra: all operations** All four operations are linked through inverse relationships. They should be used in combination, in multi-step problems and to check answers.
1 week	**Measures** The smaller the unit, the greater the number of units required to measure i.e. 10mm = 1m.	**2 weeks**	**The Number System: fractions and % of numbers** Fractions are equal parts of a whole and % are parts per 100. We can find fractions and % of numbers or amounts. Equivalency: fractions that look very different in their notation may be equal or linked to the same idea.	**2 weeks**	**Geometry: position and direction** Directions and angles are measures of turns. Positions (co-ordinates) are marked in a quadrant formed by axes found in graph work.
3 weeks	**Calculating, Patterns & Algebra X and Division** In Y5, the key is to understand the links between factors, multiples, composite and prime numbers, rather than seeing these as separate facts to be learnt. Factors and multiples are linked in an inverse relationship. Making links and generalisations between facts is a crucial step. If I know… I also know… Many big ideas come together with written multiplication and division!... Unitisation, scaling, inverse relationships, partitioning and recombining and the distributive law. Children must have a firm understanding of what multiplication and division are from previous years, as well as their inverse relationships. They must also see how fractions are connected to division.	**3 weeks**	**Calculating + and –; Statistics & Measures** The big idea is using a whole-part model to picture addition and subtraction. Drawing bar models will help to picture which operation to do. Rounding can help to get a sense of the size of the answer or to find an equivalent calculation, then adjust. Numbers should be looked at before a method is chosen to decide which will be most efficient. Measures of length, capacity and mass can be converted, added and subtracted. Scales are just another form of number lines. Time is measured different units/bases from what we are used to with metric measures. There are 60 seconds in a minute, 60 minutes in an hour, 24 hours in a day etc.. Therefore children need to use number lines to help them efficiently calculate time differences.	**3 weeks**	**The Number System: fractions as numbers** We can add, subtract, multiply and divide with fractions just like we can with whole numbers. However, the answers we find may challenge ideas we have about what happens when we multiply or divide. It is useful to view multiplication as repeated addition when dealing with fractions at this stage. Scaling may also help i.e. 'half as big as this'.
2 weeks	**The Number System: Fractions *as* numbers** Fractions are equal parts of a whole and they represent a relationship between a whole and parts of a whole. Equivalency: fractions that look very different in their notation may be equal or linked to the same idea.	**1 week**	**Geometry & Measures** Shapes are categorised according to their properties and can belong to more than one category. 2D shapes in nets define the 3D shapes they can fold into. 3D shapes have faces as well as sides and vertices. Regular shapes have sides and angles which are the same. Angles are measure of a turn and the lengths of lines used to show the angle do not change its size. Area is a measure of square units but with rectilinear shapes, it is linked to multiplication and it has an inverse relationship with side length. However, the relationship is not simple. Increasing or decreasing perimeter does not necessarily increase or decrease area.	**2 weeks**	**Calculating + and –; Statistics** Can you do it mentally? The big idea is using a whole-part model to picture addition and subtraction. Drawing bar models will help to picture which operation to do. Rounding can help to get a sense of the size of the answer or to find an equivalent calculation, then adjust. Numbers should be looked at before a method is chosen to decide which will be most efficient. Data is collected with a purpose in mind and can be represented in different ways. Numerical data can be discrete or continuous.
1 week	**Statistics** Discrete or continuous data is collected with a purpose in mind and can be represented in different ways. The ways data is represented can highlight different aspects and relationships. Inference and deduction must be used and not just retrieval when interpreting.				

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To be used as a basis for unit planning, combined with the calculation or progression policy. Each unit of work should include several problem solving lessons. NRICH is a great resource for this and has problems mapped to the curriculum here. NCETM progression maps are useful for dialling it back for children working below Y5 levels. NCETM mastery assessment document is wonderful for deepening. ***Remember the aims of the National Curriculum are: fluency, reasoning and problem solving!***			
Timing		**Fluency**	**Destinations for reaching expected Y5 level** with teaching notes.
AUTUMN	3 WEEKS	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) Counting in decimals in small steps from 0.001 to 0.1 Finding mystery numbers or marking them on differently scaled number lines. Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct.	**The Number System: big numbers and small numbers!** ***Read and write numbers to at least 1,000,000*** Noting the pattern of three digits and commas. Do lots of practice reading these numbers aloud, noting zero as a place holder. ***Recognise the place value of each digit to 1,000,000 – the significance of the position of each digit to its value/size*** 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. ***Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000*** 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. ***Recognise and use thousandths and relate them to tenths and hundredths*** 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. ***Round decimals with two decimal places to the nearest whole number and to one decimal place.*** Use number lines with different starting points and different scales to place decimal numbers. Examine misconceptions about 0.011 or 0.11 etc. ***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 <>

Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
AUTUMN	4 WEEKS	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! Find rules for and complete additive number sequences. Play games such as Shall I risk it? Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct.	**Calculating, Patterns & Algebra + and –** ***Add and subtract numbers mentally with increasingly large numbers*** Write calculations horizontally and tell children to assess whether mental methods will be quick and efficient. Use addition calculations which involve bridging multiples of 100 or 1,000 Use 'friendly numbers' which partition easily to take away e.g. 12,462 – 2,300 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. Estimate answers first using rounding and check with the inverse. ***Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy.*** Draw number lines and refer back to place value work to round numbers to the nearest 10, 100 etc. as appropriate. ***Add numbers with more than four digits (different amounts of digits and more than two numbers) using compact columnar addition*** Encourage checking that a mental method wouldn't be more efficient! Write calculations horizontally. Use place value counters to ensure understanding of compact method. Add numbers with multiple carrying. Add numbers with different numbers of digits including up to three decimal places. Add piles of numbers (more than 2 numbers) where the carry goes over 20. Find bonds to 10 and doubles in your pile to add quickly! Estimate answers first using rounding and *use + to check subtractions …* ***Subtract numbers with more than four digit numbers using compact columnar subtraction*** Review of Y4: Partition use base 10 and then place value counters. Partition numbers in different ways as a precursor to columnar subtraction. e.g. 124 = 100 + 20 + 4 or 100 + 10 + 14 etc. Explore these types of patterns. Show expanded subtraction alongside compact to ensure understanding. Design calculations so they can't be done quickly mentally and use intelligent practice e.g. one exchange from tens to ones, then multiple exchanges, then what happens when there's a zero! Use base 10 and then place value counters. Estimate answers first using rounding and check with the inverse ***Recognise and use the inverse relationship between + and - and use this to check calculations and solve missing number problems.*** ***Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.*** Write calculations 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. Pose word problems and problems in different contexts which require different calculation strategies.

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Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
AUTUMN	1 WEEK	Multiplying and dividing by 10 , 100 and 1,000 Estimating where numbers should be placed on different number lines (scales) Review 2-D shape names and question about their properties	**Measures** ***Estimate, compare and calculate different measures.*** 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. ***Measure and calculate perimeter of composite rectilinear shapes in cm and m.*** Use real life contexts to pose word problems involving missing dimensions. Lots of rich reasoning to be done here! ***Convert between different units of measure [for example, kilometre to metre].*** 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

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Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
AUTUMN	3 WEEKS	Chant any weak times table (or one you will link calculations to during the lesson). Doubling and halving by partitioning Multiply and divide numbers by 10 and 100 and 1000 Divide multiples of 100 by 20 and 25 by chunking in 20s or 25s. Find rules and missing numbers in multiplicative sequences. (Not always horizontally… show sequences with circles and arrows between, for example. Include missing numbers on measuring scales too!) Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct.	**Calculating, Patterns & Algebra X and Division** ***The key Y5 objective relating to the Y4 review below is: Multiply and divide numbers mentally drawing upon known facts*** *Y4 Review: Recall and use multiplication and division facts for multiplication tables up to 12 X 12* Assess which times tables children have the most difficulty in recalling rapidly. Repeat teaching and chanting of these. Make links with doubling and doubling where it is useful. Make links with properties of numbers. Explore the law of commutativity by showing arrays. These are factor pairs. Create 'If I know this… I know that…' statements. Multiply by 0 and 1 and then divide by 1. Multiply three numbers together. Explain the ÷ as 'how many groups of this are in that' and as the inverse of multiplication. Use derived facts to divide mentally. Find remainders (picture this on a number line, chunking forwards or using arrays). Divide numbers related to times table facts mentally e.g. I know 42 ÷7 = 6 so 420 ÷7 = 60 *Use recall of x and ÷facts and place value to multiply larger numbers mentally and explore the effect of multiplying numbers by 10, 100 and 1,000* ***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 (non-prime) numbers.*** ***Establish whether a number up to 100 is prime and recall prime numbers up to 19.*** Investigate patterns in multiples and rules of divisibility. Investigate common factors. Venn or Carroll diagrams are a great way to do this. Split composite numbers into their prime factors. Use arrays, Cuisenaire rods, Numicon or bar models to explore factors. At EP we use factor bugs as a key recall image. ***Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.*** Discuss zeros as place holders, how the numbers are becoming 10 times bigger or smaller (scaling) and avoid misconceptions about adding 0. Use procedural variation to explore patterns and the *effect of multiplying a number by 10 or 100 e.g.* *3 X 7 = 21 30 X 7 = 210 30 X 70 = 2100 3 X 70 = 210 etc.* ***Multiply numbers up to 4 digits by one digit (short multiplication) or two digits (long multiplication) using the formal written method.*** Ensure that calculations don't lend themselves to using a mental method like doubling and doubling again to X4! For example, calculate 14 X 4 by…Doubling 14 and doubling again or 14 X 4 = (10 X 4) + (4 X 4) … the distributive law. Show expanded columnar multiplication next to grid method, and then 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 ***Divide numbers up to 4 digits by a 1-digit number using the formal written method of short division and interpret remainders.*** This is the first time that this appears in the NC but children may have learnt this method in LKS2, regardless. Use the image of an open array to show how 'bus stop' division relates to multiplication and the grid method. Use place value counters to divide, being careful to structure examples intelligently with first one remainder and then the first digit carrying over etc. then dealing with zeros or remainders at the end. Use a number line to count up 'how many groups of and what's the remainder' so children don't 'pass' the multiple they're looking for when dividing… a common misconception e.g. 26 ÷ 3 = 8 r2 NOT 9r1 Use multiplication to check answers… this can lead to great reasoning about how to include remainders.

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Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
AUTUMN	2 WEEKS	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.	**The Number System: Fractions *as* numbers** *Y4 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. ***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.*** 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. 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. ***Add and subtract fractions with the same denominator and denominators that are multiples of the same number.*** 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. ***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***
AUTUMN	1 WEEK	Counting in 10s 5s 20s 25s Finding missing numbers on scales and working out the intervals. Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct.	**Statistics** ***Interpret and present discrete and continuous data using bar charts, time line graphs, pictograms and tables.*** Remember to keep bars separate from each other. Make a transition from pictograms to bar charts. Use different scales. Make links with science and topic projects when presenting data. Use a ruler to find points on a line graph. Remember to explore a 'naked' graph with no labels and say what it *could* represent! ***Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.*** Relate the scales of bar charts to number lines. Draw on methods of + and – used in previous unit of work.

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SPRING	2 WEEKS	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) Rounding numbers to the nearest 10, 100, 1000 etc. Counting in decimals in small steps from 0.001 to 0.1 Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct.	**The Number System: big *or* small numbers; negative numbers** ***Review the Autumn term Number System first unit of work and repeat or deepen exploration of either larger or smaller numbers based on your assessment:*** *Autumn review* *Read and write numbers to at least 1,000,000* *Recognise the place value of each digit to 1,000,000 – the significance of the position of each digit to its value/size* *Round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000* *Recognise and use thousandths and relate them to tenths and hundredths* *Round decimals with two decimal places to the nearest whole number and to one decimal place.* ***Read, write, order and compare numbers with up to three decimal places.*** Use number lines to order and compare, and place value counters to partition and compare decimal numbers. ***Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.*** Use temperature as a context to explore negative numbers and use number lines to find increases and decreases bridging zero. ***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 <>** Use scales on measuring equipment and link this with work on number lines and decimal fractions. ***Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.*** Compare with our number system and convert from one system to another. This does not need more than a couple of lessons!

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SPRING	4 WEEKS	Chant and memorise weaker times tables. Explore the effect of multiplying numbers by 10, 100 and 1,000. Explore the 20 X table, the 30 X table etc. 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.)	**Calculating, Patterns & Algebra: X and ÷; measures** ***The key Y5 objective relating to the Y4 review below is: Multiply and divide numbers mentally drawing upon known facts*** *Autumn review:* *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 (non-prime) numbers.* *Establish whether a number up to 100 is prime and recall prime numbers up to 19.* *Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.* *Multiply numbers up to 4 digits by one digit (short multiplication) or two digits (long multiplication) using the formal written method.* *Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately.* ***Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}).*** Use arrays to explain why squared numbers are so named. Use cubes and the concept volume to explain cubed numbers. Find the areas of squares whose sides are integers, and the volumes of cuboids to support understanding. ***Solve problems involving multiplication and division using knowledge of factors and multiples, squares and cubes.*** Provide a range of different problems, including but not exclusively, word problems. These should have different layouts, and require more than one step. ***Convert between different units of metric measure (for example , km and m; cm and m; g and kg, l and ml)*** Use equipment to explore equivalent scales so the children don't rely on 'tricks' to convert but develop understanding. Use number lines next to one another to show the connection between different units of measurement and work with practical contexts. Make sure that children link their place value number line work with reading scales on measuring equipment.

Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
SPRING	2 WEEKS	Chanting 8 times table and finding 1/8 of different numbers.	**The Number System – fractions and percentages of numbers** *Y4 review: find non-unit fractions of numbers.* Find 1/10 and then 2/10 etc. of numbers by dividing by 10. Link this to work done previously on 0.1 of a number and dividing a number by 10. Find 1/6 of a number, linking to multiplication and division facts. Show this pictorially with a bar model. Don't just teach a trick of dividing by the denominator and multiplying by the numerator! Find 2/6 or 3/6 etc. of a shape or a number. Link to equivalence. Is this the same as 1/3 of the same number? Repeat with 1/8 after chanting the 8 times table and reviewing division facts. ***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?

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SPRING	3 WEEKS	Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct. Step counting in multiples of 19 or 21 … or 1.9s etc. you could use different starting points! Find rules and missing numbers in additive sequences. (Not always horizontally… show sequences with circles and arrows between, for example.)	**Calculating + and -; Statistics and Measures** *Autumn Term Review:* *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.* *Add numbers with more than four digits (different amounts of digits and more than two numbers) using compact columnar addition* *Subtract numbers with more than four digit numbers using compact columnar subtraction* *Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.* *Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.* *Y4 Review: Solve simple money problems involving fractions and decimals to two decimal places.* Use both mental (partition and add; add nearly numbers; partition and take away; subtract nearly numbers; find the difference on a number line to find change) and written methods to solve money problems. Make sure you have plenty of plastic money and you can use a money 100p square. ***Solve problems involving converting between units of time.*** *Complete, read and interpret information including timetables. Solve comparison, sum and difference problems involving timetables.* Discuss how mental methods (find the difference) can be more effective than columnar subtraction when dealing with time. ***Solve problems involving measure (mass, length, and capacity)*** *Understand and use approximate equivalences between metric units and imperial units.* Conversion graphs might be useful to explore and link to statistics work. Practical contexts for comparing and using imperial and metric units should be set up e.g. creating recipes.

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SPRING	1 WEEK	Doubling (link to perimeter) Chant / recall square numbers and cube numbers. Count in steps of 5 or 10^{o} until you reach a right angle. Use a squeaky voice for all acute angles then a low voice for obtuse angles. Show angles with hands Chant weaker X tables	**Geometry & Measures** ***Distinguish between regular and irregular polygons based on reasoning about equal sides and angles.*** Link these with 3D shapes which they define as faces. ***Identify 3-D shapes, including cubes and other cuboids, from 2-D representations*** Draw and explore nets of shapes and use straws/tooth picks etc. and blue-tack to create skeletons of 3D shapes. Lots of visualisation work will help children to visualise numbers in other areas of maths. *Autumn review: Measure and calculate the perimeter of composite rectilinear figures in centimetres and metres.* ***Calculate and compare the area of rectangles (including squares) and use standard units, square cm and square m.*** ***Estimate the area of irregular shapes*** Show the link between the side lengths and the area of rectilinear shapes. Solve missing side length problems and work backwards from known dimensions. Investigate the changes that occur in area or perimeter when the other changes. Look at the relationship between the area of a right-angle triangle and a rectangle; a non-right-angle triangle and a rectangle by cutting or folding paper. ***Solve problems involving measure (area and volume)*** ***Estimate volume (for example using 1cm^3 blocks to build cuboids including cubes or using water).*** Relate 2D rectangles with 3D cuboids and investigate how area and shape of face contributes to volume.

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SUMMER	2 WEEKS	Count up and down in tenths finding equivalents e.g. 5/10 = 0.5 = half Solving empty box/missing number problems including those with inequalities. Divide numbers by 10 including whole numbers which will become 1 place decimal numbers.	**The Number System: Decimal fractions** *Y4 Review: Recognise and write decimal equivalents of any number of tenths or hundredths.* Placing on a number line and finding nearest whole numbers. Comparing with inequalities <> and the = symbol Find complements to 1. *Y4 Review: Recognise and write decimal equivalents to $^1/_4$, $^1/_2$, $^3/_4$.* Using a blank 100 square to represent hundredths, explore why ½ = 0.5 and ¼ = 0.25 and ¾ = 0.75 *Autumn/Spring Review: Recognise and use thousandths and relate them to tenths and hundredths* 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. *Autumn/Spring Review: Round decimals with two decimal places to the nearest whole number and to one decimal place.* Use number lines with different starting points and different scales to place decimal numbers. Examine misconceptions about 0.011 or 0.11 etc. ***Read, write, order and compare numbers with up to three decimal places.*** Use number lines to order and compare, and place value counters to partition and compare decimal numbers. ***Read and write decimal numbers as fractions e.g. 0.71 = 71/100*** ***Solve problems which require knowing decimal and percentage equivalence.*** ***Solve problems involving numbers up to three decimal places.*** Pose empty box problems that rely on understanding of place value. Include problems with = and inequalities <> Pose word problems in contexts such as money, sharing etc.

Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
SUMMER	4 WEEKS	Find rules and missing numbers in additive sequences. (Not always horizontally… show sequences with circles and arrows between, etc. Include missing numbers on measuring scales too!) Making and comparing numbers using digits cards and completing equations with digit cards to make statements correct. Chanting weaker times tables needed up to 12 X 12. Keep re-assessing missing facts. Finding division facts by using the inverse of times tables. *Y4 Review: Use recall of multiplication and division facts and place value to multiply larger numbers mentally.* Use procedural variation to explore patterns and the *effect of multiplying a number by 10 or 100 e.g.* *3 X 7 = 21 30 X 7 = 210 30 X 70 = 2100 3 X 70 = 210 etc.* Count in multiples of 6, 7, 9, 25 and 1000. Relate these to finding rules and missing numbers in multiplicative sequences.	**Calculating, Patterns & Algebra: all operations** *Autumn & Spring review of 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.* *Add numbers with more than four digits (different amounts of digits and more than two numbers) using compact columnar addition* *Subtract numbers with more than four digit numbers using compact columnar subtraction* *Recognise and use the inverse relationship between + and - and use this to check calculations and solve missing number problems.* *Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.* *Autumn & Spring review of multiplication and division:* *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 (non-prime) numbers.* *Establish whether a number up to 100 is prime and recall prime numbers up to 19.* *Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000.* *Multiply numbers up to 4 digits by one digit (short x) or two digits (long multiplication) using the formal written method.* *Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders.* *Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}).* *Solve problems involving multiplication and division using knowledge of factors and multiples, squares and cubes.* ***Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.*** Use measures as a useful context for scaling problems e.g. 'My jug holds three and a half times the capacity as yours.' **One of the best methods of visualising ratio problems is the bar model. Investigate this and use it!** Use money and time as a useful context for rates e.g. 'My phone bill costs 30p per minute…' Explore problems that require us to round up or down. Some children may be ready to explore fractions as whole numbers, decimal fractions and vulgar fractions but ensure they understand this. e .g. 435 ÷ 6 = 72.5 = 72 ½ = 72 r3 ***Solve problems involving addition, subtraction, multiplication and division and a combination of these , including understanding the meaning of =*** ***Solve two-step problems using all operations in contexts, deciding which operations and methods to use and why.*** ***Use all 4 operations to solve problems involving measure (length, mass, volume, money) using decimal notation, including scaling*** Provide lots of questions which require different approaches to be solved most efficiently. Use both mental (partition and add; add nearly numbers; partition and take away; subtract nearly numbers; find the difference on a number line to find change) and written methods to solve money problems. Have plenty of plastic money and measuring equipment! Use word problems and the contexts of measuring length, mass and capacity to solve problems. Be sure to use calculations which wouldn't be solved more efficiently mentally, and involve conversions. Estimate answers first using rounding and check with the inverse.

Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
SUMMER	2 Weeks	Count in multiples of 90, linking to the 9 X table. Review 2D shape names and properties.	**Geometry, Position & Direction** *Y4 reviews (could be done as early work or brain warm-ups because some of these skills do not appear in the Y5 curriculum)* *Identify acute and obtuse angles and order angles up to two right angles by size.* *Identify lines of symmetry in 2-D shapes presented in different orientations.* Analyse properties e.g. acute and obtuse angles, equal angles, equal sides and lines of symmetry etc. *Complete simple symmetrical figures in relation to a specific line of symmetry.* ***Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles.*** ***Draw given angles and measure them in degrees.*** ***Identify angles at a point and one whole turn; angles at a point on a straight line and a ½ turn; other multiples of 90°*** Explore the idea of an angle being a measure of a turn. Compare and estimate angles. Introduce the protractor very slowly, ensuring understanding of what is being measured i.e. The lines showing the angle could extend forever but the angle is the same size. Emphasise the steps of using a protractor – find the zero, and line it up on the point, choose a 'base line' and line this up with zero then observe whether you are using the 'inside' numbers or the 'outside' scale to measure this angle. Always see if this matches your estimate! Spot and measure angles at different orientations. Compare with obtuse or acute angles in quadrilaterals and other shapes. ***Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language.*** Ensure that children are translating by moving vertices of a shape to a new position. Tracing paper is a support but children should be encouraged to visualise the new position, checking with a mirror or tracing paper as they go.
SUMMER	2 WEEKS	Count in fractional steps starting from different numbers and discussing equivalence.	**The Number System fractions as numbers** ***Add and subtract fractions with the same denominator and denominators that are multiples of the same number.*** 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. ***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

Timing		Fluency	Destinations for reaching expected Y5 level with teaching notes.
SUMMER	2 WEEKs	Count in multiples which will relate to intervals on graph axes. Relate these to finding rules and missing numbers in multiplicative sequences. (Not always horizontally… show sequences with circles and arrows between, for example. Include missing numbers on measuring scales too!)	**Calculating + and –; Statistics** ***Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.*** Provide lots of questions which require different approaches to be solved most efficiently. ***Solve comparison, sum and difference problems using information presented in a line graph.*** ***Complete, read and interpret information in tables (*and graphs)** Explore graphs and charts of different types displaying the same information but highlighting different aspects of it. Ensure children are deducing and inferring as well as simply retrieving information.