Mathematics Journey Planner: Y2

OVERVIEW & BIG IDEAS

AUTUMN

3 weeks	**The Number System: Two digit numbers** Our number system is base 10. The teens numbers must be seen as ten and one, ten and two and so on. The names of numbers don't always give us a clue about their value or how we write them as symbols. The position (place) of a digit in a number determines its value.
4 weeks	**Calculating, Patterns & Algebra + and –** Children must understand = as 'equivalent', 'the same as' or 'balances'. Empty box problems can support this key idea, as can writing equations in different ways, altering where the = is placed. We can partition numbers into two or more parts. We can add two or more of these parts in any order (commutativity). Sometimes it is more efficient to put the larger number first but not always. Numbers can be partitioned, the parts added, then recombined. Calculate don't count on in ones! Knowing the 'story of a number' can help us add or subtract by calculating not just counting on. Use a whole-part model to picture addition and subtraction. Relate numbers to their parts (partitioning) and to multiples of 10 to bridge multiples of ten. E.g. 8 + 7 = 8 + 2 + 5 Drawing bar models will help children to picture which operation to do. Sometimes it's more efficient to 'take away' and sometimes it's more efficient to 'find the difference' when subtracting.
1 week	**Geometry** The properties of a shape tell us what name it should have and helps us to group shapes with the same or similar properties. Shapes have the same names and properties when they are at different orientations or scaled to a different size (still congruent). 2D shapes are closed shapes. 3D shapes are made up of 2D faces.
2 weeks	**The Number System: Fractions *as* numbers; Geometry: position; Measures: time** Fractions are equal parts of a whole which can be counted like any other numbers!
3 weeks	**Calculating, Patterns & Algebra X and Division** The big idea is one of 'unitisation' where children count in 'groups of' a number. Division can be seen as 'how many groups of'. The inverse relationship can also be explored through arrays. The first stage of this is understanding doubling as 'two groups of', relating his to the 2X table, and understanding halving as the inverse. Children recognise and begin to memorise 10X tables, seeing 5X tables as half of these facts. Patterns should be noticed to help memorisation.
1 week	**Statistics** Data is collected with a question or purpose in mind. Tally charts collect data over time. Data can be grouped in different ways.

SPRING

2 weeks	**The Number System: Whole numbers to 100; Measures** The position (place) of a digit in a number determines its value. We can partition numbers into tens and ones. We can position numbers on a number line to see their value relative to other numbers. We need standard units of measure in order to compare things more accurately and consistently.
3 weeks	**Calculating, Patterns & Algebra + and –; Measures** We can partition numbers in different ways and into two or more parts. We can add two or more of these parts in any order (commutativity). Drawing bar models will help to picture which operation to do. Calculate don't count! We must look at how the numbers relate to each other (whole-part bar models) before deciding which to add first, or whether to take away or find the difference. This is how the inverse is explored. 15 – 8… think what needs to be added to 8 to make 15? 15 is the whole and 8 and 7 are the parts. Coin sizes don't show their value. 100 1ps make up £1.
1 week	**Statistics** Data is collected with a question in mind and can be represented in different ways. You can use a chart or graph to answer questions. Pictograms can represent one or more than one unit of data.
3 weeks	**Calculating, Patterns & Algebra: X and ÷** 'Unitisation' means children count in 'groups of' a number. Division can be seen as 'how many groups of'. The inverse relationship can also be explored through arrays. These whole/ (equal) part relationships can be drawn using bar models. Children find patterns and links between the 2 and 4 X tables, and the 5 and 10 X tables. They can use these facts to find division facts. Doubling and halving by partitioning two digit numbers and recombining (distributive law) lays the foundation for later multiplication.
2 weeks	**The Number System: fractions of numbers; measures** Fractions are equal parts of a whole. This whole can be a shape, amount or a number. Partitioning or 'fair share' problems when each share is less than one, gives rise to fractions as does measuring when the unit is longer than the item being measured.
2 weeks	**Measures: Money** Change can be found when subtracting amounts of money. Often, 'find the difference' is the most efficient strategy.

SUMMER

3 weeks	**The Number System: Numbers to 100 and beyond; Measures** The position (place) of a digit in a number determines its value. We can partition numbers into tens and ones. We can position numbers on a number line to see their value relative to other numbers. We need standard units of measure in order to compare things more accurately and consistently.
3 weeks	**Calculating, Patterns & Algebra + and –** We can partition numbers in different ways and into two or more parts. We can add two or more of these parts in any order (the law of commutativity). Drawing bar models will help to picture which operation to do. Calculate don't count! Use whole-part and relationships to see how numbers relate to each other. This is how the inverse is explored. We must look at how the numbers relate to each other before deciding which to add first, or whether to take away or find the difference. We need standard units of measure in order to compare things more accurately and consistently.
3 weeks	**Calculating, Patterns & Algebra: X and ÷** The inverse relationship of X and ÷ can be explored through arrays and problems can be solved by using these facts. These whole/ (equal) part relationships can be drawn using bar models. Children find patterns and links between the 2 and 4 X tables, and the 5 and 10 X tables. Doubling and halving by partitioning two digit numbers and recombining (distributive law) lays the foundation for later multiplication. Dividing numbers which are not multiples of your divisor results in remainders.
2 weeks	**Measures Time** 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.
1 weeks	**Geometry** The properties of a shape tell us what name it should have and help us to group shapes with the same or similar properties. Shapes have the same names and properties when they are at different orientations or scaled to a different size (still congruent). 2D shapes are closed shapes.

Mathematics Journey Planner - Year 2			
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 Y2 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 Y2 level** with teaching notes.
AUTUMN	3 WEEKS	**Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward** At EP we call counting in 10s 'Spider counting'. Review from Y1 counting on and back in 1s and explore going beyond 100… we don't fall off the edge of the world, the pattern continues! At EP we call counting in 1s 'Wormy ones' Halving (this supports number line work by estimating where half way is). Discuss finding 'half of' the number line and 'half way between' two points etc.	**The Number System: Two digit numbers** ***Identify, represent and estimate numbers using different representations including a number line.*** ***Recognise the place value of each digit in a two digit number.*** Year 1 Review but don't skip! Explore the story of each number from 1-10 using different representations: counters, dominoes, straws, pegs, Numicon, Cuisenaire and bar modeled whole-part relationships. Make a big fuss of bonds to 10 and play games like ping pong which help to memorise bonds to 10. Investigate teen numbers and how they are ten and 1, ten and 2 etc. show this with Numicon tiles, Cuisenaire, base ten and place value cards. Really go deep on this and ensure that children are not writing 14 and 41 because of how the number 'sounds'. This is a big deal. Understanding the partitioning of teens numbers is a crucial step. Go over it in as many ways as possible. Extend work from teens numbers to partition all two digit numbers using Numicon tiles, base ten and place value cards. Place all numbers on number lines and discuss their relative value and size. Fill in missing numbers on number lines. Which is the nearest multiple of 10? At EP we call them café numbers. How far to the nearest café? It is crucial that children can represent two digit numbers in different ways, using Numicon, straws, ten frames, place value cards etc. because they need to understand at this point that if we add tens, the ones digit doesn't change! ***Compare and order numbers from 0 up to 100; use <> = signs.*** ***Use place value and number facts to solve problems.*** Make connections from these foundations to the rest of the number system 'if I know… I know…' e.g. If I know 1 + 2 = 3 then I know 21 + 2 = 23. If I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 Explore the idea of = as equivalence and balance using empty box partitions, Numicon tiles in balance scales and placing the = symbol in different places in equations. As well as making connections to solve addition problems, children should solve inequality problems, equivalence/ balance problems and empty box problems e.g.? + 5 = 35 is 20 + 10 > or < than 40 – 10. Create questions like this which draw attention to the underlying structure and place value of the digits. Give children digit cards to place to complete equations and inequalities. They should also be able to order all numbers to 100 and say which are bigger and smaller. When the children understand, securely, the value of digits, place value counters can be used to play games (e.g. Drawing 3 counters from a bag, which numbers could I make?) Explore questions such as 'how many ones in 80?' to deepen understanding.

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
AUTUMN	4 WEEKS	**Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward** Play games such as Totality and Don't roll a 6! And be explicit about which facts you could use to add without counting on in ones. Find rules and missing numbers in additive sequences.	**Calculating, Patterns & Algebra + and –** ***Recall and use addition and subtraction facts to 10 (Y1 review) 20 and 100: fluently up to 20; related facts to 100*** Bonds to 20 aren't as important as knowing bonds to 10 and then using them up to 20 e.g. (11 + 9 = 20 because I know 1 + 9 = 10) and then beyond (34 + 6 = 40 because I know 4 + 6 = 10). It is crucial that children are calculating not counting on in ones. Do lots of work to make connections from work on place value to the rest of the number system 'if I know… I know…' e.g. if I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 Draw whole-part relationships as bar models. ***Solve problems with addition and subtraction a) using concrete objects and pictorial representations including those involving numbers, quantities and measures; and b) applying their increasing knowledge of mental and written methods.*** ***Add and subtract numbers using concrete objects, pictorial representations and mentally including:*** ***a) A two digit number and ones; b) A two digit number and tens; and c) Adding three one-digit numbers;*** Write calculations horizontally (we tend to in KS1 but it's worth saying) and tell children to discuss the numbers in relation to each other. Are they far apart or close together? Which is the biggest? Smallest? Which number should we begin with? Calculate don't count on in 1s: -Quick adds e.g. 20 + 7 then 23 + 6 'because I know 3 + 6 = 9' -Partitioning single digit numbers in different ways to bridge 10 e.g. 27 + 5 = 27 + 3 + 2 -Adding strings of numbers by making bonds or finding doubles (law of commutativity explored and flexibility encouraged e.g. we would do 7 + 5 + 3 by adding 7 and 3 to make 10 then 5 more is 15. This is the expected level of mental addition in Y2. -Add 10 to numbers using spider counting (reinforced with Numicon tiles as concrete) and multiples of 10. Can children add nearly numbers such as 9 by adding 10 and subtracting 1? The 100 square is the key image for this. Use a number line to count on or back in 10s and 1s from a two digit number. Ensure that your calculations suit this strategy because you are adding a nearly number e.g. 36 + 21 or 74 – 31 Use base ten blocks to represent partitioning and then adding two two-digit numbers. Ensure you use intelligent practice to first not bridge a ten, then bridge tens, then bridge 100. 96 + 10 is usually a nice sticking point for reasoning. Use base ten blocks to represent partitioning then subtracting two two-digit numbers which don't bridge 10. ***Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.*** ***Recognise and use the inverse relationship between addition and subtraction, and use this to check calculations and solve missing number problems.*** Represent whole-part relationships using bar models and discuss how the parts can be added in any order. Write fact families (+ and -) based on these pictorial representations. Begin slowly with the concept of difference. E.g. which numbers have a difference of 1, 2, 5 or 10? Use Numicon tiles to show 'difference' and then pictorial representation as a bar model showing whole-part relationships. Find the difference on a number line by counting up or, preferably, using known number facts to calculate. NB numbers that are close together lend themselves better to 'find the difference' and numbers that are far apart lend themselves to 'take away'. Children need to spend lots of time understanding these concepts and your calculations need to be intelligently designed to suit one strategy at a time before allowing the children to choose which is best. Solve word problems that require mental addition and subtraction using strategies taught. Check subtractions with the inverse. Write calculations in different ways e.g. 23 = ? + 12; 43 + 25 = ? – 2; and 12 + 15 < ? + 2

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
AUTUMN	1 WEEK	**Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward** Play addition games, practising skills learnt in previous units. Find rules and missing numbers in additive sequences.	***Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.*** ***Compare and sort common 2-D shapes.*** Look at, sort and notice the properties of 2-D shapes at different orientations and of different sizes. Children must get the hang not just of the names but of the properties: sides, corners (vertices!), angles and line symmetry. Focus on grouping in different ways according to different properties. Venn diagrams and Carroll diagrams are great for this! ***Identify 2-D shapes on the surface of 3-D shapes*** ***Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.*** Fold and unfold nets of 3D shapes. Children should identify the 2-D shapes which define the 3D shapes. Look at groups of similar 3D shapes e.g. prisms which have rectangular faces and different shaped faces at each end which define what sort of prism they are.

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
AUTUMN	2 WEEKS	Count in fractions up to 10, starting from any number and using the1/2 and 2/4 equivalence on the number line Use a counting stick to count in 1/4s beyond 1 whole! Discuss equivalence… how else could we say 2/4? Find rules and missing fractions in sequences. Find doubles and halves.	**The Number System: Fractions *as* numbers; Geometry: position; Measures: time** ***Y1 Review: Recognise, find and name a half as one of two equal parts of an object, shape or quantity.*** ***Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.*** ***Recognise, find, name and write fractions ¼ 2/4 and ¾*** ***Recognise the equivalence of 2/4 and 1/2*** Explore equal and unequal pieces of shapes. Really emphasise that pieces must be equal and they are equal parts of a whole. Discuss what our 'whole' is. Tell them a shape is ¼ and then get them to draw the rest. Focus on the denominator as representing the parts the whole is divided into. Keep the numerators as one at the beginning (unit fractions). Show ¼ represented in different ways. You might even explore its equivalence with 2/8 of a shape. Count in fraction steps of quarters, showing pictorial representations to support understanding. Discuss how the numerator shows us how many equal parts we have… ¼ 2/4 ¾ 4/4 (or one whole!) 11/4 1 2/4 … etc. Keep going beyond 1! Discuss how else we could say 2/4 = ½. Repeat this process of counting up and down on a number line. Don't underestimate how difficult it is at first for children to write fractions using the line etc. Give them opportunities to mark fractional steps on a number line, modelled by your counting stick. Try paper folding and building a fraction wall for the half and quarter family… could you branch into 8ths?! Work on understanding what the numerator is. Look at equivalence. Add and subtract fractions in the same family. This is not in the NC for Y2 but if children have a good understanding of fractions as numbers, they should be able to add fractions with the same denominator e.g. ¼ + ¾ = 4/4 = 1 Use fraction cards to support this. https://www.ncetm.org.uk/resources/43609 Solve pictorial problems and very simple word problems involving fractions. ***Use mathematical vocabulary to describe direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).*** Relate this to work done on quarters and halves. Beebots, Probots and other computer programs are great for this! ***Tell and write the time to five minutes, including quarter past/to the hour (Y1: half past)*** Use clock faces as another representation of quarters and halves. ***Recognise name and write the fraction 1/3 of a shape*** After working on halves and quarters, what do the children think 1/3 is? Find 1/3 of different shapes and count in thirds on a number line, using the ideas from above.

Mathematics Journey Planner: Y2

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
AUTUMN	3 WEEKS	Doubling numbers to 10 and halving numbers to 20; examine this inverse relationship. Relating this to the 2X table. Chanting 5X and 10sX tables, making links. Find rules and missing numbers in sequences.	**Calculating, Patterns & Algebra X and Division** ***There is no emphasis in the Y2 Curriculum on doubling but time should be spent on doubling numbers to 10, or 12, and then relating this to the 2X table. Similarly, halving should be related to division facts.*** Look at doubling as 'two groups of' which is based on the idea of 'unitisation' where you count in 'groups of' a number. Numicon tiles are very useful for this and you can also use balance scales to show that 4 X 2 = 2 X 4, exploring the law of commutativity. ***Recall and use multiplication and division facts for the 5 and 10 times tables*** ***Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.*** Chant the 5 X table and the 10X times tables for several days (or weeks) each but then make links between them, drawing explicit attention to the doubling. Reason about 'all multiples of 10 are multiples of 5; are all multiples of 5 multiples of 10?' Investigate patterns in the digits of multiples of 5 and multiples of 10. Create arrays for multiples of 5 and 10… show inverse relationship and write X and division facts. Use bar models to show the same relationships. Use Cuisenaire rods to show 'how many 5s make 25'. Represent this with a bar model showing whole-equal parts. Show counting in groups of 5 and 10 on a number line. Solve problems by creating arrays, using Cuisenaire rods to show 'how many 5s make 20', counting on a number line (repeated addition) or using known and related facts. Represent this with a bar model showing whole-equal parts. Children should always be encouraged to use facts they know to link to solutions. Solve missing number equations, including ones which mix operations e.g. 8 X 5 = ? + 10 Explore such ideas with Numicon and Cuisenaire rods. Really focus on solving word problems that relate to multiplying and division. ***This is not in the NC but using the 2 times table is and this is an important big idea: partitioning and recombining! Double and halve two digit numbers*** Double and halve two digit numbers where the ones won't bridge ten. Use base ten blocks and draw pictures of doubling the tens and the ones then recombining them.
AUTUMN	1 WEEK	Counting in 10s 5s and 2s Tally in 5s	**Statistics** ***Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.*** ***Ask and answer simple questions by counting the number of objects in each category and sorting categories by quantity.*** Ask simple questions of the class and record as tally charts and frequency tables. From this information, interpret the data e.g. 'there are 3 more children who like swimming than basketball.' Use this data to create pictograms. Discuss how the pictograms chosen should all look the same. You could use printing for this! Create a block diagram (like a bar chart but using postits for example or Duplo bricks to physically build a block graph) using the data. Finally, if children are secure, show how this can be represented as a bar graph where the bar is continuous. Remember to keep bars separate from each other. Choose your scale carefully and talk through the decisions e.g. 'I need it to go up to beyond our largest data set.' Use and try different scales. Make links with science and topic projects. Relate the scales of bar charts to number lines. Solve word different word problems all based around the same bar chart etc.

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
SPRING	2 WEEKS	**Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward** At EP we call counting in 10s 'Spider counting'. Review from Y1 counting on and back in 1s and explore going beyond 100… we don't fall off the edge of the world, the pattern continues! At EP we call counting in 1s 'Wormy ones' Halving (this supports number line work by estimating where half way is). Discuss finding 'half of' the number line and 'half way between' two points etc.	**The Number System: Whole numbers to 100; Measures** ***Identify, represent and estimate numbers using different representations including a number line.*** ***Recognise the place value of each digit in a two digit number.*** ***Read and write numbers to at least 100 in numerals and in words.*** Autumn review: Extend work from teens numbers to partition all two digit numbers using Numicon, base ten and place value cards. Place all numbers on number lines and discuss their relative value and size. Fill in missing numbers on number lines. Which is the nearest multiple of 10? At EP we call them café numbers. How far to the nearest café? It is crucial that children can represent two digit numbers in different ways, using Numicon tiles, straws, ten frames, place value cards etc. because they need to understand at this point that if we add tens, the ones digit doesn't change! Explore how a 100 square is just a number track chopped up into 10s. Do activities where children fill in parts of empty 100 squares and count on or back in 10s from any number. Represent this with Numicon tiles, base ten or place value counters too to show how the 10s digit is the bit that changes, not the ones digit. At EP we call this spider counting. Place two digit numbers on 0-100 lines or on different sections of a number line that doesn't always start with 0! Which two digit number is half way between 50 and 60? What about 55 and 65? What about 32and 52? What about 20 and 34? Etc. Introduce a metre stick as showing 100 cm. Mark different lengths in cm on the meter stick. How do these compare to your rulers? ***Choose and use appropriate standard units to estimate and measure to the nearest appropriate unit (cm/m and ^{o}C)*** Measure and estimate measures of length using metre sticks and rulers. Tie this in with place value work, placing numbers to 100. Measure and estimate temperatures in different countries around the world and at home. Discuss how water freezes at $0^{o}C$ and boils at $100^{o}C$. Again tie this in with placing numbers on a number line and finding the nearest multiples of ten etc. A money number line would could be introduced at this point going from 0 – 100p and discussing equivalence between 100p and £1 ***Compare and order numbers (and lengths) from 0 up to 100; use <> = signs.*** ***Use place value and number facts to solve problems.*** Make connections from these foundations to the rest of the number system 'if I know… I know…' e.g. If I know 1 + 2 = 3 then I know 21 + 2 = 23. If I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 Explore the idea of = as equivalence and balance using empty box partitions, Numicon tiles in balance scales and placing the = symbol in different places in equations. As well as making connections to solve addition problems, children should solve inequality problems, equivalence/ balance problems and empty box problems e.g.? + 5 = 35 is 20 + 10 > or < than 40 – 10. Create questions like this which draw attention to the underlying structure and place value of the digits. Give children digit cards to place to complete equations and inequalities. They should also be able to order all numbers to 100 and say which are bigger and smaller. When the children understand, securely, the value of digits, place value counters can be used to play games (e.g. Drawing 3 counters from a bag, which numbers could I make?) Explore questions such as 'how many ones in 80?' to deepen understanding.

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
SPRING	3 WEEKS	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Making and comparing numbers using digits cards Find rules and missing numbers in additive sequences. (Not always horizontally… show sequences with circles and arrows between, for example.) ***Recognise and use the symbols for pounds (£) and pence (p)***	**Calculating, Patterns & Algebra + and –** ***Recall and use addition and subtraction facts to 10 (Y1 review) 20 and 100: fluently up to 20; related facts to 100*** Review number bonds and work on fluency with recall, plus understanding by drawing whole-part relationship bar models. It is crucial that children are calculating not counting on in ones. So do lots of work to make connections from work on place value to the rest of the number system 'if I know… I know…' e.g. if I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 and I know that 25 + 6 = 31 Look at common misconceptions such as 42 + 68 = 100 and really examine bonds to 100 by drawing bar models, modelling with base ten blocks (exchanging the 10 ones for a 10 rod and laying them out on a 100 block) and by looking at them on a 0-100 number line. Add several coins together, or amounts of money which support mental addition and subtraction e.g. 1p + 5p + 4p + 5p using bonds; 50p – 20p ***Solve problems with addition and subtraction a) using concrete objects and pictorial representations including those involving numbers, quantities and measures; and b) applying their increasing knowledge of mental and written methods.*** ***Add and subtract numbers using concrete objects, pictorial representations and mentally including:*** ***a) A two digit number and ones; b) A two digit number and tens; and c) Adding three one-digit numbers;*** Write calculations horizontally (we tend to in KS1 but it's worth saying) and tell children to discuss the numbers in relation to each other. Are they far apart or close together? Which is the biggest? Smallest? Which number should we begin with? Calculate don't count on in 1s: -Quick adds and takeaways e.g. 20 + 7 then 23 + 6 'because I know 3 + 6 = 9' or 24 – 5 because 24 – 4 = 20 then take one more away to make 19 -Partitioning single digit numbers in different ways to bridge 10 e.g. 27 + 5 = 27 + 3 + 2 -Adding strings of numbers by making bonds or finding doubles (law of commutativity explored and flexibility encouraged e.g. we would do 7 + 5 + 3 by adding 7 and 3 to make 10 then 5 more is 15. This is the expected level of mental addition in Y2. -Add 10 to numbers using spider counting (reinforced with Numicon tiles as concrete) and multiples of 10. Can children add nearly numbers such as 9 by adding 10 and subtracting 1? The 100 square is the key image for this. Use a number line to count on or back in 10s and 1s but in bigger jumps e.g. adding 30 in one jump, from a two digit number. Ensure that your calculations suit this strategy because you are adding a nearly number e.g. 36 + 21 or 74 – 31 or 47 + 29. Use money as a context for adding in this way. Use base ten blocks to represent partitioning and then adding two two-digit numbers. Ensure you use intelligent practice to first not bridge a ten, then bridge tens, then bridge 100. 96 + 10 is usually a nice sticking point for reasoning. Relate this to expanded columnar addition only if children are adding three digit numbers. They should always be able to add two digit numbers mentally. Use money – bonds to £1 – as a context for this. ***Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.*** ***Recognise and use the inverse relationship between addition and subtraction, and use this to check calculations and solve missing number problems.*** Represent whole-part relationships using bar models and discuss how the parts can be added in any order. Write fact families (+ and -) based on these pictorial representations. Autumn review: concept of difference. E.g. which numbers have a difference of 1, 2, 5 or 10? Use bar models showing whole-part relationships to explore the concept of 'difference'. Find the difference on a number line by counting up from one two digit number to another, first bridging one ten then several tens. Use 'the story of' numbers to count to the nearest multiple of ten etc.. Use intelligent practice to ensure your calculations use numbers that are not too far apart or lend themselves to 'taking away'. You could slip in things like 100 – 1 though to make sure they use 'take away' when it's appropriate! Money, and specifically finding change, is a wonderful context for this. Counting up to find change from £1 is the best method of 'subtraction'. Solve word problems that require mental addition and subtraction using strategies taught. Check subtractions with the inverse. Write calculations in different ways e.g. 25p = ? + 12p ; 43p + 25p = ? – 2p; and £1.20 + 15p < ? +2p

Mathematics Journey Planner: Y2

Timing		Fluency	Destinations for reaching expected Y2 level with teaching notes.
SPRING	1 WEEK	Counting in 10s 5s and 2s Tally in 5s.	**Statistics** ***Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.*** ***Ask and answer simple questions by counting the number of objects in each category and sorting categories by quantity.*** ***Ask and answer questions about totalling and comparing categorical data.*** Look at pictograms and discuss how one icon could represent more than one thing, if secure! E.g. the fish = 10 people. Why is this useful? Ask and answer questions by looking at a tally chart, frequency table, block diagram and, if children are secure, a bar chart. Relate the scales of bar charts to number lines. Solve word different word problems all based around the same bar chart etc.
SPRING	3 WEEKS	Doubling numbers to 10 and halving numbers to 20; examine this inverse relationship. Relating this to the 2X table. Chanting 2X and 3X tables, making links. Find rules and missing numbers in sequences.	**Calculating, Patterns & Algebra X and Division** ***There is no emphasis in the Y2 Curriculum on doubling but time should be spent on doubling numbers to 10, or 12, and then relating this to the 2X table. Similarly, halving should be related to division facts.*** Look at doubling as 'two groups of' which is based on the idea of 'unitisation' where you count in 'groups of' a number. Numicon tiles are very useful for this and you can also use balance scales to show that 4 X 2 = 2 X 4, exploring the law of commutativity. ***Recall and use multiplication and division facts for the 2 and 4 times tables NB children do not need to memorise 4 X table facts this year but it is good to explore the link between these times tables.*** ***Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.*** ***Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in context.*** Chant the 2 X table and the 4X times tables for several days (or weeks) each but then make links between them, drawing explicit attention to the doubling and doubling again of numbers. Reason about 'all multiples of 4 are multiples of 2; are all multiples of 2 multiples of 4?' Investigate patterns in the digits of multiples of 2 and multiples of 4. Explore and review what even numbers are and *why* they are even (divisible by 2). Create arrays for multiples of 2 and 4… show inverse relationship and write X and division facts. Use bar models to show the same relationships. Use Cuisenaire rods to show 'how many 2s make 12'. Represent this with a bar model showing whole-equal parts. Show counting in groups of 2 and 4 on a number line. Solve problems by creating arrays, using Cuisenaire rods to show 'how many 2s make 12', counting on a number line (repeated addition) or using known and related facts. Represent this with a bar model showing whole-equal parts. Children should always be encouraged to use facts they know to link to solutions. Solve missing number equations, including ones which mix operations e.g. 8 X 2 = ? + 10 Explore such ideas with Numicon and Cuisenaire rods. Really focus on solving word problems that relate to multiplying and division. ***This is not in the NC for Y2 but using the 2 times table is and this is an important big idea: partitioning and recombining! Double and halve two digit numbers*** Double and halve two digit numbers where the ones won't bridge ten and then where it does! Use base ten blocks and draw pictures of doubling the tens and the ones then recombining them.

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SPRING	2 WEEKS	**Count in steps of 3.** Chant the 3X table (this is in the Y3 curriculum but will be useful for this unit of work) Find rules and missing numbers in fractional sequences. (Not always horizontally… show sequences with circles and arrows between, for example.)	**The Number System: fractions of numbers; measures** ***Recognise name and write 1/3 or ¼ of a shape, set of objects or quantity. (unit fractions)*** ***Write simple fractions for example, ½ of 6 = 3*** After working on halves and quarters, what do the children think 1/3 is? Find 1/3 of different shapes and count in thirds on a number line, using the ideas from above. Find 1/3 of shapes and then numbers by dividing by 3. The children won't yet know their 3 x table so will need to link to work on division and use strategies to divide by 3 that they used for dividing by 5 or 10 etc. Find ¼ of shapes then numbers by dividing by 4. They will be able to relate finding ¼ to dividing by 4 and their 4X table facts. Be sure to find unit fractions first and show pictorially with bar models. Relate to real life context of measuring or 'fair sharing' in word problems. Represent problems pictorially to support understanding. Find 1/3 or ¼ of a length of ribbon etc. relating fractions to measures. ***Recognise, name and write 2/4 or ¾ of a shape, set of objects or quantity. (non-unit fractions)*** Find 1/4 of shapes and then numbers by dividing by 4. They will be able to relate finding ¼ to dividing by 4 and their 4X table facts. Be sure to find unit fractions first and show pictorially with bar models. Next, find 2 or ¾ of this quantity, showing this with a bar model. Relate to real life context of measuring or 'fair sharing' in word problems. Represent problems pictorially to support understanding. Find ¼ or ¾ of a length of ribbon etc. relating fractions to measures.
SPRING	2 WEEKS	Count in steps of 5p, 20p and 10p etc. to support money work. Rehearse number bonds to 100	**Measures** ***Recognise and use symbols for pounds and pence NB£1.40 not £1.40p!*** ***Recognise and use the inverse relationship between + and –*** ***Recall and use addition and subtraction facts to 20 and 100*** ***Solve problems in a practical context involving addition and subtraction of money of the same unit, including giving change.*** Add multiple coins – Interactive Resources has great money mazes and money grids to add and find the difference with coins. Make sure you use plenty of plastic money. Review of earlier unit on + and -: Money, and specifically finding change, is a wonderful context for this. Counting up to find change from £1 is the best method of 'subtraction'. Solve word problems that require mental addition and subtraction using strategies taught. Check subtractions with the inverse. Use bar models to help children to visualise how to solve money problems using strategies they know. Ask what half of £1 or quarter of £1 would be… use a number money line to support this.

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SUMMER	3 WEEKS	**Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward** At EP we call counting in 10s 'Spider counting'. Review from Y1 counting on and back in 1s and explore going beyond 100… we don't fall off the edge of the world, the pattern continues! At EP we call counting in 1s 'Wormy ones' Halving (this supports number line work by estimating where half way is). Discuss finding 'half of' the number line and 'half way between' two points etc.	**The Number System: Whole numbers to 100; Measures** ***Identify, represent and estimate numbers using different representations including a number line.*** ***Recognise the place value of each digit in a two digit number.*** ***Read and write numbers to at least 100 in numerals and in words.*** Do activities where children fill in parts of empty 100 squares and puzzles that mean reasoning about numbers beyond 100, counting on or back in 10s from three digit numbers. Represent this with Numicon tiles, base ten or place value counters too to show how the 10s digit is the bit that changes, not the ones digit. At EP we call this spider counting. Place two digit numbers on 0-100 lines (or three digit numbers on a 0-1,000 line if children are secure) or on different sections of a number line that doesn't always start with 0! Which two digit number is half way between 50 and 60? What about 55 and 65? What about 32and 52? What about 20 and 34? Etc. ***Choose and use appropriate standard units to estimate and measure to the nearest appropriate unit (g/kg and ml/l)*** Introduce number line scales on the sides of measuring cylinders and on weighing scales showing 0-1,000. Mark different capacities in ml or grams. Discuss and use measuring equipment to explore 1,000ml = 1l and 1,000g = 1kg. This is not specified in the NC but weighing and measuring capacity is so children will have to start getting a feel for three digit numbers and sensible divisions at 100s or 50s. ***Compare and order numbers (and weights and capacities) from 0 up to 100 then beyond; use <> = signs.*** ***Use place value and number facts to solve problems.*** Make connections from these foundations to the rest of the number system 'if I know… I know…' e.g. If I know 1 + 2 = 3 then I know 21 + 2 = 23. If I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 Explore the idea of = as equivalence and balance using empty box partitions, Numicon tiles in balance scales and placing the = symbol in different places in equations. Weighing mass is a great opportunity to use balance scales in a real life context! As well as making connections to solve addition problems, children should solve inequality problems, equivalence/ balance problems and empty box problems e.g. ? + 5 = 35 is 20 + 10 > or < than 40 – 10. Create questions like this which draw attention to the underlying structure and place value of the digits. Give children digit cards to place to complete equations and inequalities. They should also be able to order all numbers to 100 and say which are bigger and smaller. Give children real scales to read when measuring mass or capacity. When the children understand, securely, the value of digits, place value counters can be used to play games (e.g. Drawing 3 counters from a bag, which numbers could I make?) Explore questions such as 'how many ones in 80?' to deepen understanding.

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SUMMER	3 WEEKS	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Making and comparing numbers using digits cards Find rules and missing numbers in additive sequences. (Not always horizontally… show sequences with circles and arrows between, for example.) ***Recognise and use the symbols for millilitres and litres; grams and kilograms.*** Discuss how kilo means 1,000 but milli does not mean a million!	**Calculating, Patterns & Algebra + and –; Measures** ***Recall and use addition and subtraction facts to 10 (Y1 review) 20 and 100: fluently up to 20; related facts to 100*** Review number bonds and work on fluency with recall, plus understanding by drawing whole-part relationship bar models. It is crucial that children are calculating not counting on in ones. So do lots of work to make connections from work on place value to the rest of the number system 'if I know… I know…' e.g. if I know 4 + 6 = 10, 24 + 6 = 30. If I know 5 + 5= 10, 5 + 6 = 11 and I know that 25 + 6 = 31 Look at common misconceptions such as 42 + 68 = 100 and really examine bonds to 100 by drawing bar models, modelling with base ten blocks (exchanging the 10 ones for a 10 rod and laying them out on a 100 block) and by looking at them on a 0-100 number line. Can they extend this to numbers to 1,000? Add several amounts in grams or ml together, which support mental addition and subtraction e.g. 53g + 500g + 100g deciding which to add first (law of commutativity); 500g – 250g ***Solve problems with addition and subtraction a) using concrete objects and pictorial representations including those involving numbers, quantities and measures; and b) applying their increasing knowledge of mental and written methods.*** ***Add and subtract numbers using concrete objects, pictorial representations and mentally including:*** ***b) A two digit number and ones; b) A two digit number and tens; and c) Adding three one-digit numbers;*** Write calculations horizontally (we tend to in KS1 but it's worth saying) and tell children to discuss the numbers in relation to each other. Calculate don't count on in 1s: -Quick adds and takeaways e.g. 20 + 7 then 23 + 6 'because I know 3 + 6 = 9' or 24 – 5 because 24 – 4 = 20 then take one more away to make 19 -Partitioning single digit numbers in different ways to bridge 10 e.g. 27 + 5 = 27 + 3 + 2 -Adding strings of numbers by making bonds or finding doubles (law of commutativity explored and flexibility encouraged e.g. we would do 7 + 5 + 3 by adding 7 and 3 to make 10 then 5 more is 15. This is the expected level of mental addition in Y2. -Add 10 to numbers using spider counting (reinforced with Numicon tiles as concrete) and multiples of 10. Can children add nearly numbers such as 9 by adding 10 and subtracting 1? The 100 square is the key image for this. Use a number line to count on or back in 10s and 1s but in bigger jumps e.g. adding 30 in one jump, from a two digit number. Ensure that your calculations suit this strategy because you are adding a nearly number e.g. 36 + 21 or 74 – 31 or 47 + 29. Use money as a context for adding in this way. Use base ten blocks to represent partitioning and then adding two two-digit numbers. Ensure you use intelligent practice to first not bridge a ten, then bridge tens, then bridge 100. 96 + 10 is usually a nice sticking point for reasoning. Relate this to expanded columnar addition only if children are adding three digit numbers. They should always be able to add two digit numbers mentally. Use mass and capacity as a context for this. ***Show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.*** ***Recognise and use the inverse relationship between addition and subtraction, and use this to check calculations and solve missing number problems.*** Represent whole-part relationships using bar models and discuss how the parts can be added in any order. Write fact families (+ and -) based on these pictorial representations. Autumn/Spring review: concept of difference. E.g. which numbers have a difference of 1, 2, 5 or 10? Use bar models showing whole-part relationships to explore the concept of 'difference'. Find the difference on a number line by counting up from one number to another, first bridging one ten then several tens. Use 'the story of' numbers to count to the nearest multiple of ten etc.. Use intelligent practice to ensure your calculations use numbers that are not too far apart or lend themselves to 'taking away'. You could slip in things like 100 – 1 though to make sure they use 'take away' when it's appropriate! Use near amounts of grams and ml to solve measures problems using strategies taught. Check subtractions with the inverse. Write calculations in different ways e.g. 230 grams = ? + 20 grams ; 430 + 50 = ? – 20; and 120 + 105 < ? + 2

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SUMMER	3 WEEKS	Doubling numbers to 10 and halving numbers to 20; examine this inverse relationship. Relating this to the 2X table. Chant weaker times tables from the 2s, 5s and 10s Find rules and missing numbers in sequences.	**Calculating, Patterns & Algebra X and Division** ***This is not in the NC but using the 2 times table is and this is an important big idea: partitioning and recombining! Double and halve two digit numbers*** Double and halve two digit numbers where the ones won't bridge ten and then where it does! Use base ten blocks and draw pictures of doubling the tens and the ones then recombining them. ***Recall and use multiplication and division facts for the 2 and 4 times tables; the 5 and 10 X tables, including recognising even numbers*** ***NB children do not need to memorise 4 X table facts this year but it is good to explore the link between these times tables.*** ***Show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.*** ***Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and facts, including problems in context.*** Explore and investigate odd and even numbers. Solve problems by creating arrays, using Cuisenaire rods to show 'how many 2s make 12', counting on a number line (repeated addition) or using known and related facts. Represent this with a bar model showing whole-equal parts. Children should always be encouraged to use facts they know to link to solutions. Solve missing number equations, including ones which mix operations e.g. 8 X 2 = ? + 10 Really focus on solving word problems that relate to multiplying and division. You could look at what happens when you divide a number like 21 by 2… the beginning of reasoning about remainders. The book *Remainder of One* is great for this.
SUMMER	2 WEEKS	Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 Count in 5s and 15s	**Measures: Time** ***Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on the clock face to show these times.*** ***Know the number of minutes in an hour and number of hours in a day.*** Use an analogue clock to show the hour hand and how it moves slowly all the time. Then introduce the minute hand. See if they can estimate one minute closing their eyes and putting their hand up when they think a minute has passed. Talk about how there are 60 minutes in the hour and our clocks are marked in 5 minutes. 15 minutes = quarter past, 30 minutes = half past and 45 minutes = quarter to the next hour. Use the language 'past' and 'to' and when we use these different words. ***Compare and sequence intervals of time*** Use time lines, placing days of the week or months of the year in order, starting in different places. Chant these at any opportunity. Use a time line to place times of the day including O'clock, quarter past, half past and quarter to the hour. Link to fractions work in the Spring.

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SUMMER	1 WEEK	Rehearse mental addition and subtraction strategies.	**Geometry** ***Autumn Review: Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.*** ***Compare and sort common 2-D shapes.*** Look at, sort and notice the properties of 2-D shapes at different orientations and of different sizes. Children must get the hang not just of the names but of the properties: sides, corners (vertices!), angles and line symmetry. Focus on grouping in different ways according to different properties. Venn diagrams and Carroll diagrams are great for this! This time focus more on different types of triangle and different types of quadrilateral, gradually introducing more names and groupings. ***Identify 2-D shapes on the surface of 3-D shapes*** ***Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.*** This time, focus more on nets of shapes and building 3-D shapes in order to explore their properties. Fold and unfold nets of 3D shapes. Children should identify the 2-D shapes which define the 3D shapes. Look at groups of similar 3D shapes e.g. prisms which have rectangular faces and different shaped faces at each end which define what sort of prism they are.