Hopton Primary School

Calculation Policy

January 2020

(Updated September 2021)

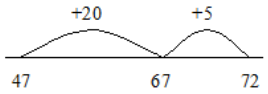
Overview of Calculation Approaches

Early Years into KS1

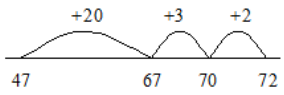
- Visualisation to secure understanding of the number system, especially the use of place value resources such as Base 10, Numicon, 100 Squares and abaci.
- Secure understanding of numbers to 10, using resources such as Numicon, Tens Frames, fingers and multi-link.
- Substituting to begin making links between the different images of a number and their links to calculation.
- Practical, oral and mental activities to understand calculation.
- Personal methods of recording.

Key Stage 1

- Introduce signs and symbols ***(+ , -, x, ÷ in Year 1 and <, > signs in Year 2)***
- Extended visualisation to secure understanding of the number system beyond 100, especially the use of place value resources such as Base 10, Place Value Charts & Grids, Number Grids, Arrow Cards and Place Value Counters.
- Further work on subitising and Tens Frames to develop basic calculation understanding, supported by Numicon and multi-link.
- Continued use of practical apparatus to support the early teaching of 2-digit calculation. For example, using Base 10 or Numicon to demonstrate partitioning and exchanging before these methods are taught as jottings / number sentences.



or



- Methods of recording / jottings to support calculation (e.g. partitioning or counting on).
- Use images such as empty number lines to support mental and informal calculation.

Year 3

- Continued use of practical apparatus, especially Place Value Counters, Base 10 and Gattegno charts to visualise written / column methods before and as they are actually taught as procedures.
- Continued use of mental methods and jottings for 2 and 3 digit calculations.
- Introduction to more efficient informal written methods / jottings including expanded methods and efficient use of number lines (especially for subtraction).
- Column methods, where appropriate, for 3 digit additions and subtractions.

Years 4-6

- Continued use of practical apparatus, especially Place Value Counters and Base 10 to visualise written / column methods before and as they are actually taught as procedures and to embed the place value of decimal numbers
- Continued use of mental methods for any appropriate calculation up to 6 digits.

- Standard written (compact) / column procedures to be learned for all four operations
- Efficient informal methods (expanded addition and subtraction, grid multiplication, division by chunking) and number lines are still used when appropriate. Develop these to larger numbers and decimals where appropriate.

N.B. Children must still be allowed access to practical resources to help visualise certain calculations, including those involving decimals

General Principles of Calculation

When faced with a calculation, children are able to decide which method is most appropriate and have strategies to check its accuracy.

Whatever method is chosen (in any year group), it must still be underpinned by a secure and appropriate knowledge of number facts.

By the end of Year 5, children should:

- have a secure knowledge of number facts and a good understanding of the four operations in order to:
  - carry out calculations mentally when using one-digit and two-digit numbers
  - use particular strategies with larger numbers when appropriate
- use notes and jottings to record steps and part answers when using longer mental methods
- have an efficient, reliable, compact written method of calculation for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally;

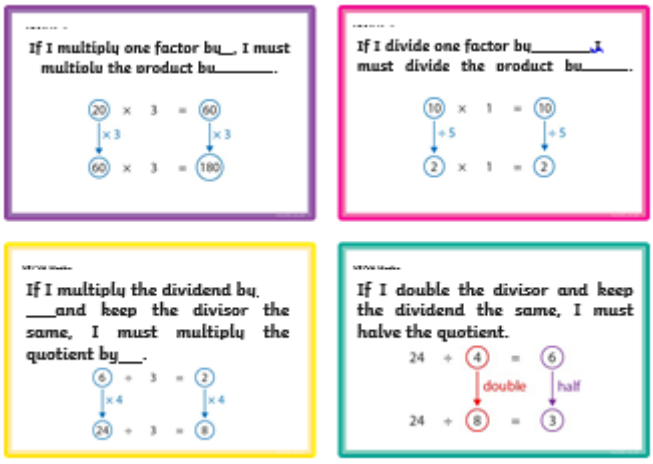
Children should always **look at the actual numbers (not the size of the numbers**) before attempting any calculation to determine whether or not they need to use a written method.

Therefore, the key question children should always ask themselves before attempting a calculation is: -

The Importance of Vocabulary in Calculation

It is vitally important that children are exposed to the relevant calculation vocabulary throughout their progression through the four operations. At Hopton staff have a vocabulary progression ladder and from Spring 2021 will be starting to incorporate stem sentences. (See separate documents: Maths vocabulary progression at Hopton and Hopton stem sentences)

Additional Vocabulary:
The vocabulary/stem sentences contain both the key and additional vocabulary children should be exposed to. Teachers will introduce and use stem sentences in lessons and reference stem sentences on display in the classroom (see examples below)



Conceptual Understanding
Using key vocabulary highlights some important conceptual understanding in calculation. For example, the answer in a subtraction calculation is called the difference. Therefore, whether we are counting back (taking away), or counting on, to work out a subtraction calculation, either way we are always finding the difference between two numbers.

Mental Methods of Calculation

Oral and mental work in mathematics is essential, particularly so in calculation.

Early practical, oral and mental work must lay the foundations by providing children with a good understanding of how the four operations build on efficient counting strategies and a secure knowledge of place value and number facts.

Later work must ensure that children recognise how the operations relate to one another and how the rules and laws of arithmetic are to be used and applied.

On-going oral and mental work provides practice and consolidation of these ideas. It must give children the opportunity to apply what they have learned to particular

cases, exemplifying how the rules and laws work, and to general cases where children make decisions and choices for themselves.

The ability to calculate mentally forms the basis of all methods of calculation and has to be maintained and refined. A good knowledge of numbers or a **'sense' of number** is the product of structured practice and repetition. It requires an understanding of **number patterns and relationships** developed through **directed enquiry,** use of **models and images** and the application of **acquired number knowledge and skills**. Secure mental calculation requires the ability to:

- ***recall key number facts instantly*** – for example, all number bonds to 20, and doubles of all numbers up to double 20 **(Year 2)** and multiplication facts up to 12 × 12 **(Year 4);**
- **use taught strategies to work out the calculation** – for example, recognise that addition can be done in any order (commutative law) and use this to add mentally a one-digit number to a one-digit or two-digit number **(Year 1),** add two-digit numbers in different ways **(Year 2),** add and subtract numbers mentally with increasingly large numbers **(Year 5);**
- understand how the rules and laws of arithmetic are used and applied – for example to use commutativity in multiplication **(Year 2),** estimate the answer to a calculation and use inverse operations to check answers **(Years 3 & 4),** use their knowledge of the order of operations to carry out calculations involving the four operations **(Year 6).**

The first 'answer' that a child may give to a mental calculation question would be based on instant recall.

E.g. "What is 12 + 4?", "What is 12 x 4?", "What is 12 – 4?" or "What is 12÷ 4?" giving the immediate answers "16", "48", "8" or "3"

Other children would still work these calculations out mentally by counting on from 12 to 16, counting in 4s to 48, counting back in ones to 8 or counting up in 4s to 12.

From instant recall, children then develop a bank of mental calculation strategies for all four operations, in particular addition and multiplication.

These would be practised regularly until they become refined, where children will then start to see and use them as soon as they are faced with a calculation that can be done mentally.

Informal Written Methods and Mental Jottings

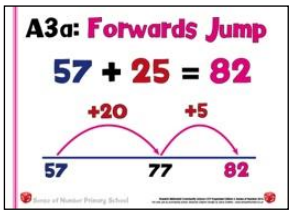
The ***New Curriculum for Mathematics*** sets out progression in written methods of calculation, which highlights the compact written methods for each of the four operations. It also places emphasis on the need to '*add and subtract numbers mentally'* (Years 2 & 3), mental arithmetic '*with increasingly large numbers'* (Years 4 & 5) and '*mental calculations with mixed operations and large numbers'* (Year 6). There is very little guidance, however, on the 'jottings' and informal methods that

support mental calculation, and which provide the link between answering a calculation entirely mentally (without anything written down) and completing a formal written method with larger numbers.

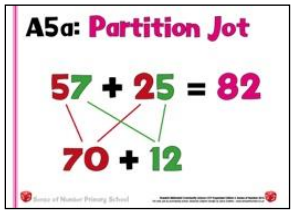
This policy (especially in the progression of addition and multiplication) provides very clear guidance not only as to the development of formal written methods, but also the jottings, expanded and informal methods of calculation that embed a sense of number and understanding before column methods are taught. These extremely valuable strategies include:

Addition

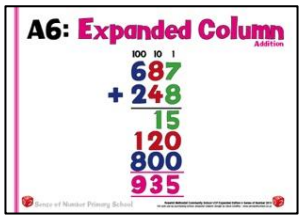
Number lines



Partitioning

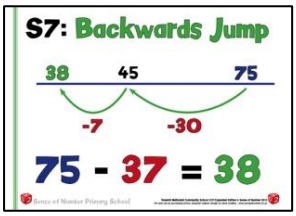


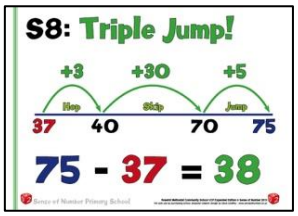
Expanded methods



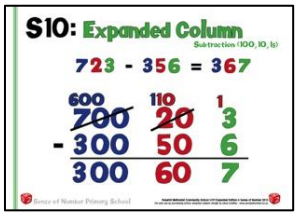
Subtraction

Number lines for counting on and back



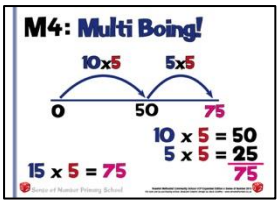


Expanded subtraction

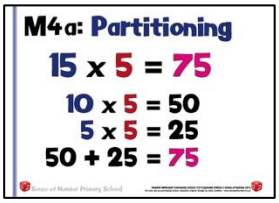


Multiplication

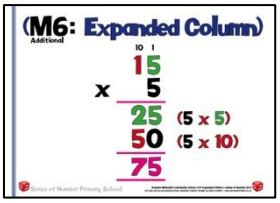
Number lines



Partitioning

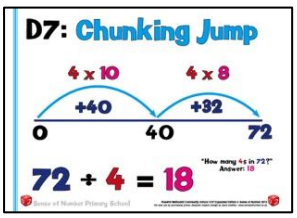


Expanded methods

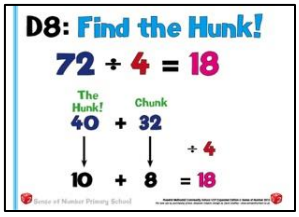


Division

Number lines



Chunking as a jotting



Formal (Column) Written Methods of Calculation

The aim is that by the end of **Year 6**, the great majority of children should be able to ***use an efficient written method for each operation with confidence and understanding with up to 4 digits***.

This guidance promotes the use of what are commonly known as 'standard' written methods –methods that are efficient and work for any calculation, including those that involve whole numbers or decimals. They are compact and consequently help children to keep track of their recorded steps.

Being able to use these written methods gives children an efficient set of tools they can use when they are unable to carry out the calculation in their heads or do not have access to a calculator. We want children to know that they have such a reliable, written method to which they can turn when the need arises.

In setting out these aims, the intention is that schools adopt greater consistency in their approach to calculation that all teachers understand and towards which they work.

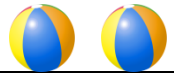
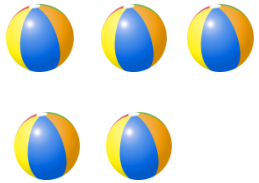
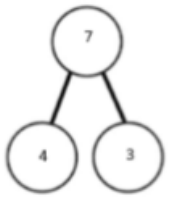
There has been some confusion previously in the progression towards written methods and for too many children the staging posts along the way to the more compact method have instead become end points. While this may represent a significant achievement for some children, the great majority are entitled to learn how to use the most efficient methods.

The challenge for teachers is determining when their children should move on to a refinement in the method and become confident and more efficient at written calculation.

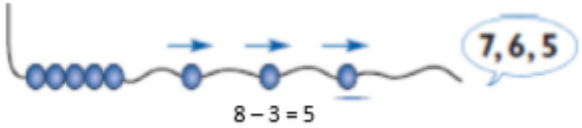
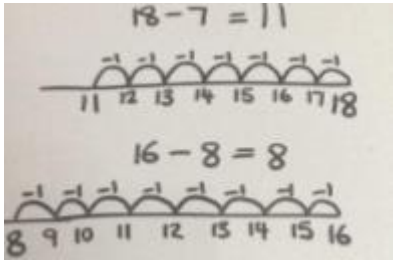
The entitlement to be taught how to use efficient written methods of calculation is set out clearly in the National Curriculum objectives. Children should be equipped to decide when it is best to use a mental or written method based on the knowledge that they are in control of this choice as they are able to carry out all methods with confidence.

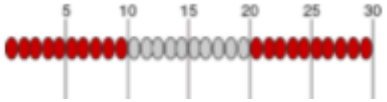
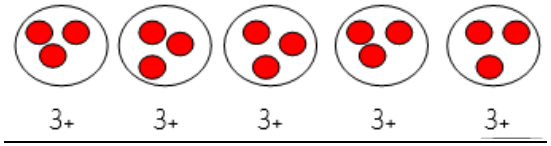
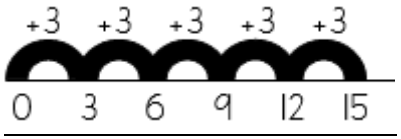
This policy does, however, clearly recognise that whilst children should be taught the efficient, formal written calculation strategies***, it is vital that they have exposure to models and images, and have a clear conceptual understanding of each operation and each strategy*** under our mastery approach.

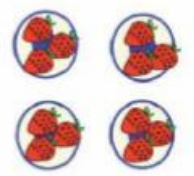
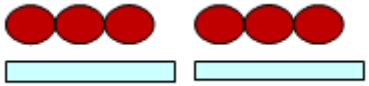
This allows children to compare different strategies and to ask key questions, such as, 'what's the same, what's different?'

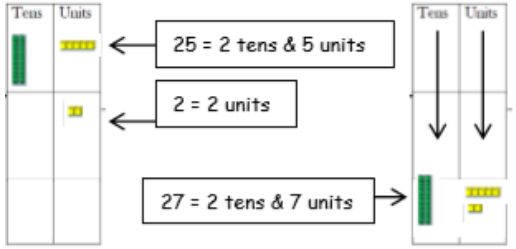
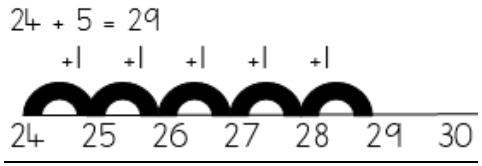
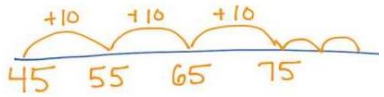
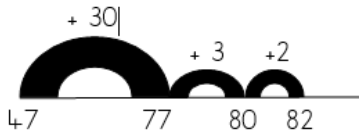
	Mental Calculation - Concrete	Written Calculation -Pictorial and Abstract	Default for ALL children
EYFS Y1 +	<u>Vocabulary</u> add, plus, and, altogether, more, make, sum, total, how many more to make? <u>Finger counting</u> Counting on fingers to match the objects being counted.  <u>Number beads and counting sticks</u> Both number beads and counting sticks are used to help children count on. 5 + 3 = 8   <u>Using objects</u> I buy 2 balls and my friend buys 3 balls. How many balls did we buy altogether?  	Using pictures of objects I buy 2 balls and my friend buys 3 balls. How many balls did we buy altogether?  This can be recorded as: 3 + 2 = 5 Using marks on paper as symbols (This stage is quicker than drawing pictures.) 6 people are on the bus. 5 more get on at the next stop. How many people are on the bus now? You can begin to use the language of addition: 6 + 5 = 11  Abstract 4 + 3 = 7 Four is a part, 3 is a part and the whole is seven.  	Combining two parts to make a whole: part whole model. Starting at the bigger number and counting on- using fingers or cubes. Regrouping to make 10 using ten frame. Understanding that addition can be in any order (communicative law)

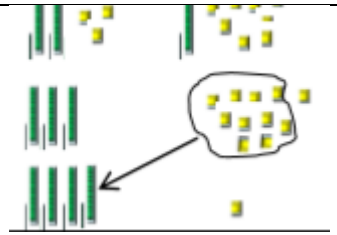
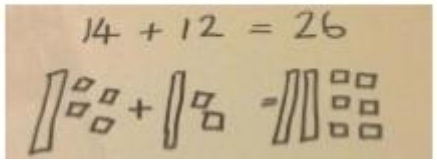
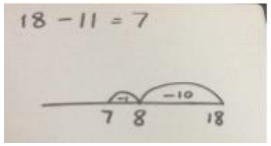
	<u>Counting On</u> 5 + 7 = 12 Children would remember the number 7 and using their fingers or cubes count on   5 more.		
EYFS Y1 –	<u>Vocabulary</u> subtract, take away, minus, leave, less, left over, how many are left?, how many are gone?, fewer <u>Objects</u> I have 5 cakes. I eat 2 of them. How many do I have left? 	<u>Pictures</u> I have 5 cakes. I eat 2 of them. How many do I have left?  You can record it like this: 5 – 2 = 3	To know that subtraction is not commutative and that the larger number must always come first - Use knowledge of number bonds to 10 and 20 to reason (9 + 1 = 10 so 10 – 9 = 1 and 10 – 1 = 9)

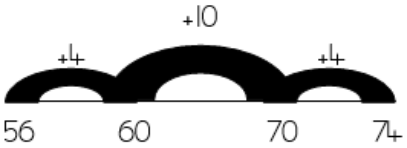
	<u>Finger counting</u> Count back from 8, putting 1 finger down at a time until you have placed 3 down. 8. 7, 6, 5 Place 3 in your head. Count up from the smaller number 3 to get to 8. You will have 5 fingers up  Bead strings and counting sticks will be used to support subtraction by counting backwards  8 – 3 = 5	<u>Using marks on paper as symbols</u> Mum baked 9 biscuits. I ate 5. How many were left?  Begin to use the language of subtraction: Eg: 9 – 5 = 4 Children will use a prepared number line to solve simple subtraction stories and number sentences by counting backwards  7 – 4 = 3 Children are taught how to use a blank number line for subtraction (counting backwards) and then encouraged to draw their own number line to help solve problems Children will begin with TU – U that lie within the tens boundary then move onto TU – U that cross the tens boundary 	

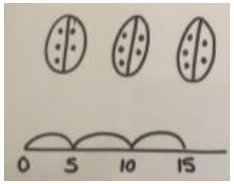
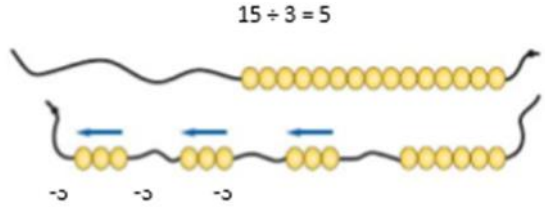
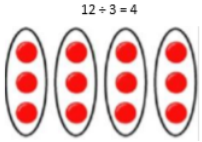
EYFS **Y1** **x**	Vocabulary groups of, repeated Children will count groups of the same number of objects and add them together The children learn about grouping in practical contexts and through pictorial representations Count groups of 2 and then count all objects to add them together. Recall doubles of numbers up to and including 10  Children will recognise and complete patterns and sequences involving multiples of 2, 5 and 10. Money is often used here – counting in 2ps, 5ps and 10ps. 	Pictures (using understanding of grouping) We have 3 plates and 2 cupcakes on each of them. How many cupcakes do we have altogether?  Marks on paper using own symbols We have 3 plates and 2 cupcakes on each of them. How many cupcakes do we have altogether? This could be recorded as : 2 + 2 + 2 = 6  Starting to think as repeated addition and arrays Repeated addition 5 x 3 = 15 (5 sets of 3)  Drawing a number line help children to see the steps that have been made. 	Children will count groups of the same number of objects and add them together. The children learn about grouping in practical contexts, through pictorial representation Children will be introduced to an array to support multiplication and to support the understanding that multiplication is repeated addition

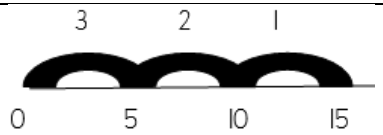
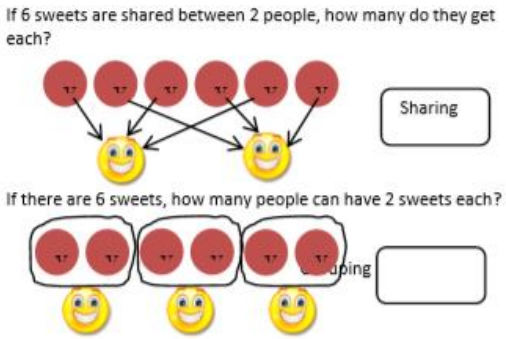
EYFS Year 1 **÷**	<u>Vocabulary</u> sharing, into groups, fairly, equal, halve, share, one each…two each… three each etc Children experience early division by sharing objects and counting how many in each group  Children will solve problems including halving and sharing.  Children will recognise and write the division symbol (÷) in mathematical statements, calculating the answer with the teacher using concrete objects 	<u>Pictures</u> If there are 5 pots and 10 pencils, how many pencils are there in each pot?  5 sets. 10 pencils, give 5 sets of 2 pencils. <u>Markings on paper (symbols)</u> 6 cakes shared between 2. Each person would get 2 cakes each. 	Share objects into equal groups and count how many in each group Solve practical problems that involve sharing into equal groups

Year 2 **+**	Vocabulary add, addition, plus, and, altogether, more, make, sum, total, increase, number line, count on, partition. Children will use concrete objects add: a 2digit number and units, three 1-digit numbers and a 2-digit number and multiples of 10. 25 + 2 =27  Children will partition numbers into tens and units when adding two 2-digit numbers that cross the tens boundary. 23 + 18 = 41	On a number line (using jumps of 1)  No number line 24 + 5 = 29 Children are encouraged to place the larger number in their head and count up in 1's, using fingers as an aid. Then using a number line count on in tens then units e.g. add 45 + 32  Number line (using efficient jumps on an empty number line) 35 + 47 = 82  	Know that addition is the inverse of subtraction - Add numbers mentally, including: 2-digit number and units A multiple of 10 to a 2-digit number Two 2-digit numbers Three 1-digit numbers - Use knowledge of inverse to check calculations and solve missing number problems - Use knowledge of number bonds to 10 to calculate numbers bonds to 100 - Count on in tens from any given number (e.g 19 – 29 – 39 – 49 etc)

		Children place the larger number onto the front of the line. Then they partition the other number and jump the 10's, then the 1's. (Instead of a large jump of 30, 3 smaller jumps of 10 could be made, depending on the confidence of the child.) Children will solve simple addition problems using concrete objects and pictorial representations, including those involving number, quantities and measures George has 14 strawberries and Jess has 12 strawberries. How many strawberries are there altogether? 	
Year 2 -	<u>Vocabulary</u> subtract, take away, minus, leave, less, left over, how many are left? To know that subtraction is the inverse of addition - Use knowledge of inverse to check calculations and solve missing number problems - Subtract numbers mentally, including: subtracting units from a 2-digit number	Children are encouraged to use a blank number line to solve TU – TU and count back in tens and then units by: • Positioning the first number in the number sentence at the end of the number line. • Partitioning the second number into tens and units • Counting back in tens (or multiples of 10) • Counting back in units 	

	subtracting a multiple of 10 from a 2-digit number subtracting a 2-digit number from another 2-digit number - Recall and use subtraction facts to 20 fluently - Use knowledge of number bonds to 100 (multiples of 10) to reason (40 + 60 = 100 so 100 – 60 = 40 and 100 – 40 = 60) <u>Advanced finger counting</u> Children place 99 in your head and using your fingers count back: 	<u>Counting on line</u> Children will use their knowledge of difference to use a blank number line to count on from the smallest number to the largest number (in tens and units) to solve subtraction number sentences (TU – TU) Eg: 74 – 56 = 18  Children will be encouraged to draw their own number line and begin to decide on the most efficient strategy: whether to start with the smaller number and count on (currently used for numbers that are close together) or start with the larger number and count back. Recognise and use inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems	
Year 2 X	<u>Vocabulary</u> odd, even, twos, fives, tens, threes, lots of, groups of, once, twice, three times, five times, ten times, multiple of, times, multiply, multiply by, repeated addition, array, row, column, double Count forwards and backwards in multiples of 3. - Know the 2, 5 and 10 times tables (in and out of order)	Children will solve one-step multiplication problems (including missing number problems) using fingers where one finger, for example, may represent 5 so 3 x 5 = 3 fingers. In addition, pictorial representations are used. I have 3 ladybirds with 5 spots each. How many spots do they have altogether?	

	- Recognise odd and even numbers Children will be able to represent a multiplication calculation using a concrete array and write the multiplication symbol within a number sentence. Children will also understand that multiplication can be carried out in any order (commutative)  3 x 5 = 15 5 x 3 = 15		
Year 2 **÷**	Children use number beads and number sticks to recall division facts for the 2, 5 and 10 times tables.  To recall halves for even numbers up to and including 20	Children will understand the operation of division as grouping using repeated subtraction on a prepared number line. Children will be able to represent a division calculation using an array and write the division within a number sentence How many groups of 3 are in 12?  Division as repeated subtraction using a number line 15÷ 5 = 3. Start at 15. Jump back in 5's until you land on 0. Count the number of jumps	To know that division is the inverse of multiplication

		 Children will be taught to understand the difference between sharing and grouping. Children will also connect unit fractions to equal sharing and grouping. 	

LOWER KEY STAGE 2

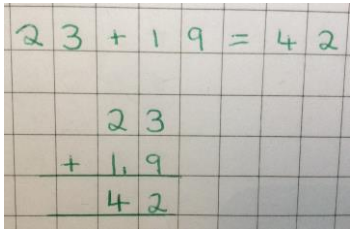
In Lower Key Stage 2, children build on the concrete and conceptual understandings they have gained in Key Stage 1 to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers.

Addition and subtraction: Children are taught to use place value and number facts to add and subtract numbers mentally and they will develop a range of strategies to enable them to discard the 'counting in 1s' or fingers-based methods of Key Stage 1. In particular, children will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.	**Multiplication and division:** This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to 12 × 12. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a 1-digit number are taught, as are mental strategies for multiplication or division with large but 'friendly' numbers, e.g. when dividing by 5 or multiplying by 20.	**Fractions and decimals:** Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form, as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of 1-place decimals, multiplying and dividing whole numbers by 10 and 100.

Year 3

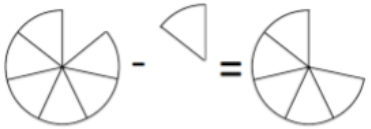
L.O. To add numbers up to 3 digits using formal written methods of columnar addition

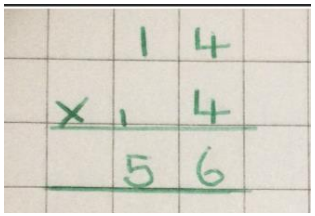
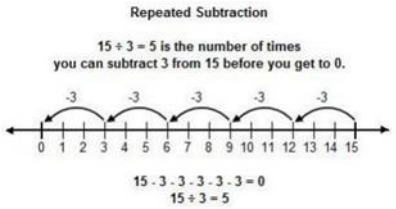
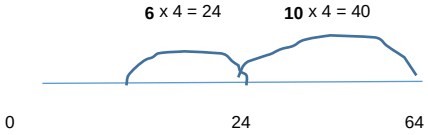
	Mental calculation	Written calculation	Default for ALL children
Y3 +	Know pairs with each total to 20 e.g. *2 + 6 = 8, 12 + 6 = 18, 7 + 8 = 15* Know pairs of multiples of 10 with a total of 100 Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning Add multiples and near multiples of 10 and 100 Perform place-value additions without a struggle e.g. *300 + 8 + 50 = 358* Use patterns of similar calculations e.g. 8 + 5 = 13 28 + 5 = 23	Children start with horizontal expansion. e.g. 445 +134 400 + 100 = 500 40 + 30 = 70 5 + 4 = 9 Children begin to set out TU + TU (that lie within the tens boundary) in columns and record as vertical expanded column addition. This method allows children to see what happens to numbers in the standard written method.	Know pairs of numbers which make each total up to 10, and which total 20 Notice doubles and number bonds to 10 Add two 2-digit numbers by counting on in 10s and 1s e.g. *56 + 35 is 56 + 30 and then add the 5* Understand simple place-value additions e.g. *200 + 40 + 5 = 245* Use place value to add multiples of 10 or 100

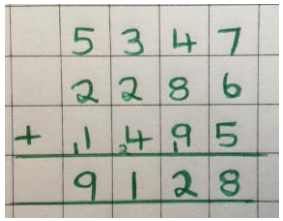
	38 + 5 = 43 Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number e.g. *104 + 56 is 160 since 104 + 50 = 154 and 6 + 4 = 10* *676 + 8 is 684 since 8 = 4 + 4 and 76 + 4 + 4 = 84* Add pairs of 'friendly' 3-digit numbers e.g. *320 + 450* Begin to add amounts of money using partitioning Lower ability children may use fingers and or concrete tools to support in confidence building.	Vertical expansion: 445 + 134 9 70 500 579 Children then move onto formal written method which may include carrying over for middle and higher abilities. Lower ability children may focus on not crossing the tens boundary.  Children begin to set out TU + TU (that cross the tens boundary) in columns and record as column addition moving onto HTU Formal column method 445 + 134 579	

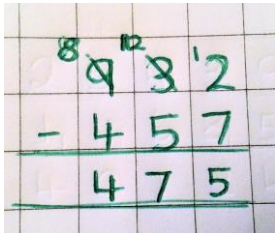
		With carrying (position of carried ten sits on the top line) 5 7 8 + 2 $1_1$5 7 9 3 Children will solve simple addition problems using concrete objects and pictorial representations, including those involving number, quantities and measures Begin to add like fractions e.g. $^3/_8 + {}^1/_8 + {}^1/_8$ Recognise fractions that add to 1 e.g. $^1/_4 + {}^3/_4$ e.g. $^3/_5 + {}^2/_5$	
	L.O. To subtract numbers mentally C1 **L.O. To subtract numbers with up to 3 digits using formal written methods C2**		
Y3 –	Lots of quick number bond subtraction. Know pairs with each total to 20 e.g. *8 – 2 = 6* e.g. *18 – 6 = 12* e.g. *15 – 8 = 7* Children may use fingers or counters to support. Children look at number patterns 5 – 3 = 2 50 – 30 = 20	Use counting up as an informal written strategy for subtracting pairs of 3-digit numbers e.g. *423 – 357* Children start with horizontal expansion 475 – 237 475 – 200 =275 275 – 30 = 245 245 – 7 = 238 This may be done with number lines.	Know pairs of numbers which make each total up to 10, and which total 20 Count up to subtract 2-digit numbers e.g. *72 – 47* Subtract multiples of 5 from 100 by counting up e.g. *100 – 35* Subtract multiples of 10 and 100

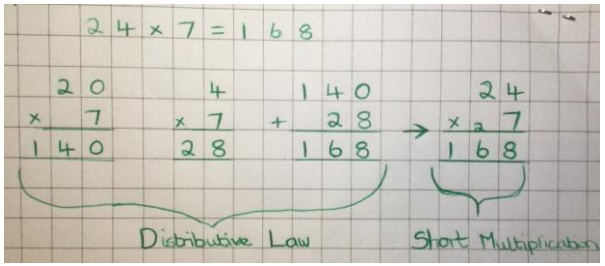
	500 – 300 = 200 Subtract any two 2-digit numbers Perform place-value subtractions without a struggle e.g. *536 – 30 = 506* Subtract 2-digit numbers from numbers > 100 by counting up e.g. *143 – 76 is done by starting at 76. Then add 4 (80), then add 20 (100), then add 43, making the difference a total of 67* Subtract multiples and near multiples of 10 and 100 Subtract, when appropriate, by counting back or taking away, using place value and number facts Find change from £1, £5 and £10	Formal vertical method: 7 3 - 3 1 4 2 3 5 9 - 4 2 3 1 7 Once confident, the children then move to 'exchanging'. $^{7}\not{8}\ ^{1}2$ - 3 5 4 7 Children that require additional support may use Base 10 or place value counters to aid their understanding. For additional mastery children will look at inverse operations, missing number problems etc. Children practise subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency Begin to subtract like fractions e.g. $^{7}/_{8} - {}^{3}/_{8}$	

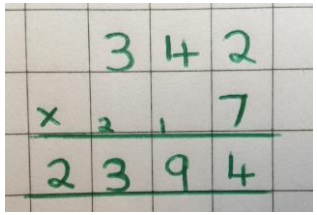
		$^{6}/_{7} - {}^{1}/_{7} = {}^{5}/_{7}$ 	
	L.O. To calculate 2 digit x 1 digit multiplication using times tables they know, mental progressing to formal C7		
Y3 **×**	Lots of quick fire calculations. Know by heart all the multiplication facts in the ×2, ×3, ×4, ×5, ×8 and ×10 tables while focusing on the 3, 4 and 8 tables. Multiply whole numbers by 10 and 100 Recognise that multiplication is commutative Use place value and number facts in mental multiplication e.g. *30 × 5 is 15 × 10* Double numbers up to 50	Partition teen numbers to multiply by a 1-digit number e.g. 4 x 13 = 52 4 x 10 = 40 4 x 3 = 12 40 + 12 = 52 Then move onto 20 getting progressively harder. Children will be move onto more formal methods of expanded multiplication. (TU x U) using the formal written method of expanded column multiplication. 14 x 4 = 56 1 4 X 4 1 6 4 0 5 6 Use partitioning to multiply 2-digit and 3-digit numbers by 'friendly' 1-digit numbers Children then move onto the formal method of multiplication.	Know by heart the x3, x4 ×8 tables Double given tables facts to get others Double numbers up to 25 and multiples of 5 to 50

			
	L.O. To divide using times tables and 2 digit by 1 digit using mental progressing to formal methods. C7		
Y3 **÷**	Know by heart all the division facts derived from the ×2, ×3, ×4, ×5, ×8 and ×10 tables Divide whole numbers by 10 or 100 to give whole number answers Recognise that division is not commutative Use place value and number facts in mental division e.g. *84 ÷ 4 is half of 42* Divide larger numbers mentally by subtracting the 10th multiple as appropriate e.g. *57 ÷ 3 is 10 + 9 as 10 × 3 = 30 and 9 × 3 = 27*	Children start with a number line and low digit divisors. e.g. 15 ÷ 3 =  64 ÷ 4  10 + 6 = 16 Find unit fractions of quantities and begin to find non-unit fractions of quantities	Know by heart the division facts derived from the ×3, ×4 and ×8 tables Perform divisions within the tables e.g. *36 ÷ 4*

	Mental calculation	Written calculation	Default for ALL children
	N2b - To find 1000 more or less than a given number		
Y4 +	Add any two 2-digit numbers by partitioning or counting on Know by heart/quickly derive number bonds to 100 and to £1 Add to the next 100, £1 and whole number e.g. *234 + 66 = 300* e.g. *3·4 + 0·6 = 4* Perform place-value additions without a struggle e.g. *300 + 8 + 50 + 4000 = 4358* Add multiples and near multiples of 10, 100 and 1000 Add £1, 10p, 1p to amounts of money Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate e.g. *4004 + 156 by knowing that 6 + 4 = 10 and that 4004 + 150 = 4154 so the total is 4160*	Column addition for 3-digit and 4-digit numbers  Add like fractions e.g. $^3/_5 + {}^4/_5 = {}^7/_5 = 1\ {}^2/_5$ Be confident with fractions that add to 1 and fraction complements to 1 e.g. $^2/_3 + \_ = 1$	Add any 2-digit numbers by partitioning or counting on Number bonds to 20 Know pairs of multiples of 10 with a total of 100 Add 'friendly' larger numbers using knowledge of place value and number facts Use expanded column addition to add 3-digit numbers
Y4 –	<u>Vocabulary</u> subtract, subtraction, minus, decrease, leave, how many are left/left over?, difference between, how many more/fewer is… than…?, how much more/less is…?, Is the same as, equals, sign. Column subtraction, decomposition, exchange, multiples of thousand, inverse. Subtract any two 2-digit numbers	<u>Decomposition (compact method)(Formal written method)</u> Children will subtract numbers with up to 4-digits using the formal written method of column subtraction with decomposition Start with three digit number not requiring any adjustment/regrouping. Move onto questions that require adjustment and finish with questions involving zero.	Use counting up with confidence to solve most subtractions, including finding complements to multiples of 100 e.g. *512 – 287* e.g. *67 + _ = 100*

	Know by heart/quickly derive number bonds to 100 Perform place-value subtractions without a struggle e.g. *4736 – 706 = 4030* Subtract multiples and near multiples of 10, 100, 1000, £1 and 10p Subtract multiples of 0·1 Subtract by counting up e.g. *503 – 368 is done by adding* *368 + 2 + 30 + 100 + 3 (so we added 135)* Subtract, when appropriate, by counting back or taking away, using place value and number facts Subtract £1, 10p, 1p from amounts of money Find change from £10, £20 and £50	 Starting in the units column, we look to see if the larger number is on top of the calculation, if it is subtract straight away, however if like the example where the smaller number is 2 the top we need to exchange one of the tens from the next column to the left, which now makes the number not 2 but 12, now subtract the 7 which equals 5. Because of the previous exchange the 3 it is no longer a 3 but a 2, which 5 cannot be subtracted away from, so an exchange from the next column has reoccur, so the 2 is no longer a 2 but a 12 which 5 can be subtracted from. Because we have exchanged again the 9 is longer worth that and has become a 8, the 4 can now be taken away from the 8. Use complementary addition to subtract amounts of money, and for subtractions where the larger number is a near multiple of 1000 or 100 e.g. *2002 – 1865* Pupils continue practise in subtracting fractions with the same denominator to become fluent through a variety of increasingly complex problems beyond one whole.	

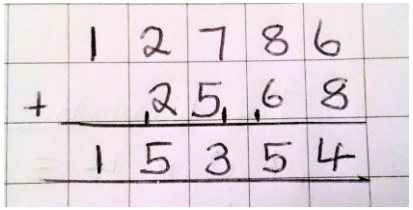
		$^{6}/_{4} - {}^{3}/_{4} = {}^{3}/_{4}$  Subtract like fractions e.g. $^{4}/_{5} - {}^{3}/_{5} = {}^{1}/_{5}$ Use fractions that add to 1 to find fraction complements to 1 e.g. $1 - {}^{2}/_{3} = {}^{1}/_{3}$	
Y4 ×	Vocabulary multiply, multiplied by, product, short multiplication, partition, distributive law, commutative, groups of, multiply, times, multiples, inverse. Know all times tables up to and including 12 x 12 (by the end of Year 4) - Recognise and use factor pairs (e.g factor pairs for numbers up to and including 10) - Know that TU x 5 is TU x 10 then divide by 2 (e.g 18 x 5 = (18 x 10) ÷ 2 = 90)	Children will be taught to multiply numbers (TU x U) using the formal written method of short multiplication and will link with the Distributive Law method  Children will be taught to multiply numbers (HTU & U) by partitioning the 3digit number and using	Know by heart multiplication tables up to 12 × 12 Multiply whole numbers by 10 and 100 Use the grid method to multiply a 2-digit or a 3-digit number by a number ≤ 6

	- Know that TU x 9 is TU x 10 then subtract TU (e.g 18 x 9 = (18 x 10) – 18 = 162) Recognise factors up to 12 of 2-digit numbers Multiply whole numbers and 1-place decimals by 10, 100, 1000 Multiply multiples of 10, 100 and 1000 by 1-digit numbers e.g. *300 × 6* e.g. *4000 × 8* Use understanding of place value and number facts in mental multiplication e.g. *36 × 5 is half of 36 × 10* e.g. *50 × 60 = 3000* Partition 2-digit numbers to multiply by a 1-digit number mentally e.g. *4 × 24 as 4 × 20 and 4 × 4* Multiply near multiples by rounding e.g. *33 × 19 as (33 × 20) – 33* Find doubles to double 100 and beyond using partitioning Begin to double amounts of money e.g. *£35·60 doubled is £71·20*	two short multiplications along with addition to solve the problem.  Children will be taught to multiply numbers (HTU x U) using the formal written method of short multiplication and will link with the Distributive Law method.	
Y4 **÷**	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, to give whole number answers or answers with 1 decimal place Divide multiples of 100 by 1-digit numbers using division facts e.g. *3200 ÷ 8 = 400*	Use a written method to divide a 2-digit or a 3-digit number by a 1-digit number Give remainders as whole numbers Begin to reduce fractions to their simplest forms Find unit and non-unit fractions of larger amounts	Know by heart all the division facts up to 100 ÷ 10 Divide whole numbers by 10 and 100 to give whole number answers or answers with 1 decimal place Perform divisions just above the 10th multiple using the written layout and understanding how to give a remainder as a whole number Find unit fractions of amounts

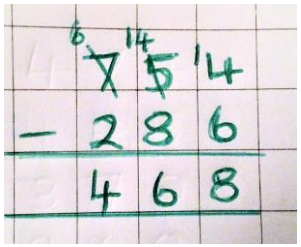
	Use place value and number facts in mental division e.g. *245 ÷ 20 is half of 245 ÷ 10* Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate e.g. *156 ÷ 6 is 20 + 6 as 20 × 6 = 120 and 6 × 6 = 36* Find halves of even numbers to 200 and beyond using partitioning Begin to halve amounts of money e.g. *half of £52·40 is £26·20*		

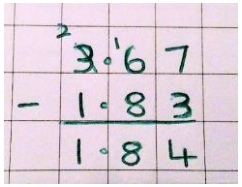
UPPER KEY STAGE 2		
Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions.		
Addition and subtraction: Children will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to 2 decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Negative numbers will be added and subtracted.	**Multiplication and division:** Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as *40 000 × 6* or *40 000 ÷ 8*. In addition, it is in Years 5 and 6 that children extend their knowledge and confidence in using written algorithms for multiplication and division.	**Fractions, decimals, percentages and ratio:** Fractions and decimals are also added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers. Children will also calculate simple percentages and ratios.

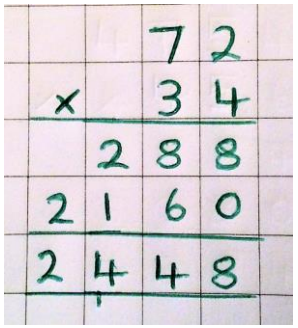
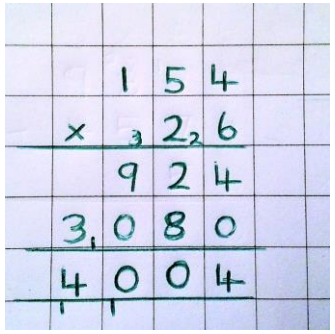
Year 5	
	Learning objectives: **C1 – To add and subtract numbers mentally with increasingly large numbers** **C2 – To add and subtract whole numbers with more than 4 digits using a formal method.**

	Mental calculation	Written calculation	Default for ALL children
Y5 +	Reinforce number bonds to 100 and 1000 from previous years. Quick mental maths questions are usually a starter at the start of a lesson. When working with decimals, know number bonds to 1 and to the next whole number Add to the next 10 from a decimal number e.g. *13·6 + 6·4 = 20* Add numbers with 2 significant digits only, using mental strategies e.g. *3·4 + 4·8* e.g. *23 000 + 47 000* Add 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 + 7000* e.g. *600 000 + 700 000* Add near multiples of 10, 100, 1000, 10 000 and 100 000 to other numbers e.g. *82 472 + 30 004* Add decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 + 1·99* e.g. *£34·59 + £19·95* Use place value and number facts to add two or more 'friendly' numbers, including money and decimals e.g. *3 + 8 + 6 + 4 + 7* e.g. *0·6 + 0·7 + 0·4* e.g. *2056 + 44*	Recap on addition with smaller numbers from previous years Use column addition to add two or three whole numbers with up to 5 digits LA children will start on adding with no carrying. MA children will move onto numbers with higher digits including carrying and larger numbers. In year 5 children use the traditional compact written method for addition for the following problem. 12786 people visited the museum last year. The numbers increased by 2568 this year. How many people visited the museum altogether?  Start by adding the units 6+8=14, place the 4 into the answer box into the correct column and carry the ten(1) into the next column to the left. Now add the tens column including the one that you have just carried over, 8+6=14+1=15. Place the 5 from the 15 into the correct column in the answer box, with the extra being carried into the next column to the left. Continue in this way until all	Add numbers with only 2 digits which are not zeros e.g. *3·4 + 5·8* Derive swiftly and without any difficulty number bonds to 100 Add 'friendly' large numbers using knowledge of place value and number facts Use expanded column addition to add pairs of 4- and 5-digit numbers

		columns have been added remembering to carry when needed. Use column addition to add any pair of 2-place decimal numbers, including amounts of money Begin to add related fractions using equivalences e.g. $^1/_2 + {}^1/_6 = {}^3/_6 + {}^1/_6$ Choose the most efficient method in any given situation.	
	Learning objectives: **C1 – To add and subtract numbers mentally with increasingly large numbers** **C2 – To add and subtract whole numbers with more than 4 digits using a formal method.** **C4 - solve addition and subtraction multi-step problems** **F10- solve problems involving numbers up to 3 decimal places**		
Y5 –	Subtract numbers with 2 significant digits only, using mental strategies e.g. *6·2 – 4·5* e.g. *72 000 – 47 000*	When children are confident using the expanded method this can be squashed into the traditional decomposition method. In year 5 pupils use the	Derive swiftly and without difficulty number bonds to 100

	Subtract 1- or 2-digit multiples of 10, 100, 1000, 10 000 and 100 000 e.g. *8000 – 3000* e.g. *60 000 – 200 000* Subtract 1- or 2-digit near multiples of 10, 100, 1000, 10 000 and 100 000 from other numbers e.g. *82 472 – 30 004* Use complementary addition for subtractions where the larger number is a multiple or near multiple of 1000 with known number bonds. Use complementary addition for subtractions of decimal numbers with up to 2 places, including amounts of money Subtract decimal numbers which are near multiples of 1 or 10, including money e.g. *6·34 – 1·99* e.g. *£34·59 – £19·95* Use counting up subtraction, with knowledge of number bonds to 10, 100 or £1, as a strategy to perform mental subtraction e.g. *£10 – £3·45* e.g. *1000 – 782* Recognise fraction complements to 1 and to the next whole number e.g. *1 $^{2}/_{5}$ + $^{3}/_{5}$ = 2*	compact column subtraction method to subtract numbers with up to 5 digits.  Starting in the units column, we look to see if the larger number is on top of the calculation, if it is subtract straight away, however if like the example where the smaller number is o the top we need to exchange one of the tens from the next column to the left, which now makes the number not 4 but 14, now subtract the 6 which equals 8. Because of the previous exchange the 5 it is no longer a 5 but a 4, which 8 cannot be subtracted away from, so an exchange from the next column has reoccur, so the 4 is no longer a 4 but a 14 which 8 can be subtracted from. Because we have exchanged again the 7 is longer worth that and has become a 6, the 2 can now be taken away from the 6. LA children start with larger digits always on the top e.g. 9467 -8123 = MA progress to numbers that require ‘exchanging’ or ‘borrowing’ from the next column.	Use counting up with confidence to solve most subtractions, including finding complements to multiples of 1000 e.g. *3000 – 2387*

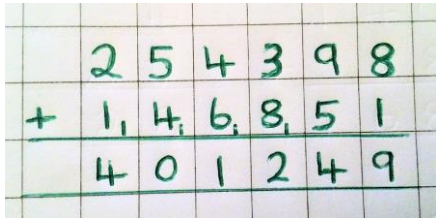
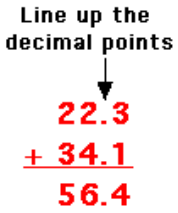
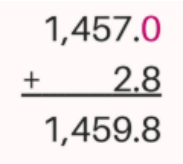
		HA children progress again onto numbers that require 'exchanging' or 'borrowing' across more than 1 column e.g. 10,000 – 7986. <u>Decomposition (compact method)(Formal written method)</u> Children then move onto subtracting decimals up to 2 decimal places from whole numbers or from similar decimal numbers 3. 67 – 1.83 =  Begin to subtract related fractions using equivalences Choose the most efficient method in any given situation e.g. $^1/_2 - {}^1/_6 = {}^2/_6$ Convert each fraction into the lowest common multiple (LCM) or lowest common denominator (LCD) ½ = 3/6 3/6 – 1/6 = 2/6 = 1/3	
	C7a To multiply numbers up to 4 digits by 1 and 2 digit numbers using the formal methods of short and long multiplication		
Y5 **×**	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100, 1000, 10 000	In year 5 children move onto multiplying using the formal written method with TU by TU	Know multiplication tables to 11 × 11 Multiply whole numbers and 1-place decimals by 10, 100 and 1000 Use knowledge of factors as aids to mental multiplication

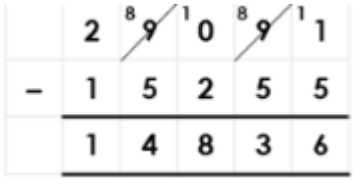
	Use knowledge of factors and multiples in multiplication e.g. *43 × 6 is double 43 × 3* e.g. *28 × 50 is ½ of 28 × 100 = 1400* Use knowledge of place value and rounding in mental multiplication e.g. *67 × 199 as 67 × 200 – 67* Use doubling and halving as a strategy in mental multiplication e.g. *58 × 5 is half of 58 × 10* e.g. *34 × 4 is 34 doubled twice* Partition 2-digit numbers, including decimals, to multiply by a 1-digit number mentally e.g. *6 × 27 as 6 × 20 (120) plus 6 × 7 (42)* e.g. *6·3 × 7 as 6 × 7 (42) plus 0·3 × 7 (2·1)* Double amounts of money by partitioning e.g. *£37·45 doubled is £37 doubled (£74) plus 45p doubled (90p) giving a total of £74·90*	 Children then progress onto long multiplication to multiply 3-digit and 4-digit numbers by a 2 digit number, starting with a number between 11 and 20.  Start in the units 4 x 5 = 20 and record the 0 in the units column of the first answer box and carry the 2. Then 7 x 5 = 35. Add the 2 carried. Write the 7 in the tens column and carry the3. Next 4 x 5 = 20 add the 3. Write the 23 to make the first part 2370**.** Now we need to multiply by 10. We record a 0 in the units column which represents the tens from	e.g. 4 x 4 = 16 40 x 4 = 160 400 x 4 = 1600 Using times tables knowledge and counting the zeros 40 x 60 = 2400 e.g. *13 × 6 is double 13 × 3* e.g. *23 × 5 is ½ of 23 × 10*

		the 45 .Now we multiply 4 by 4 =16 and record it in the tens column underneath. Then we multiply 4 by 7= 28.Then 4 x 4 = 16 add the 2 to give 18 Record this in the answer box. Which makes 18960**.** Now the two answers need adding together to get a final total, which is done by the standard written addition method. This gives the final answer of 21330 Choose the most efficient method in any given situation Find simple percentages of amounts e.g. *10%, 5%, 20%, 15% and 50%* Begin to multiply fractions and mixed numbers by whole numbers ≤ 10 e.g. $4 \times {}^{2}/_{3} = {}^{8}/_{3} = 2\,{}^{2}/_{3}$	
	L.O. To use the formal short division method		
Y5 **÷**	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000, 10 000 to give whole number answers or answers with 1, 2 or 3 decimal places Use doubling and halving as mental division strategies e.g. *34 ÷ 5 is (34 ÷ 10) × 2*	Use short division to divide a number with up to 4 digits by a number ≤ 12 **84÷4 =☐** $\begin{array}{r} 21 \\ \hline 4\overline{)\,84} \end{array}$ Build in remainders – 'What does this mean?' 'Left over / doesn't share exactly'	Know by heart division facts up to 144 ÷ 12 Divide whole numbers by 10, 100 or 1000 to give answers with up to 1 decimal place Use doubling and halving as mental division strategies Use an efficient written method to divide numbers ≤ 1000 by 1-digit numbers Find unit fractions of 2- and 3-digit numbers

	Use knowledge of multiples and factors, as well as tests for divisibility, in mental division e.g. *246 ÷ 6 is 123 ÷ 3* e.g. *We know that 525 divides by 25 and by 3* Halve amounts of money by partitioning e.g. *½ of £75·40 = ½ of £75 (£37·50) plus half of 40p (20p) which is £37·70* Divide larger numbers mentally by subtracting the 10th or 100th multiple as appropriate e.g. *96 ÷ 6 is 10 + 6, as 10 × 6 = 60 and 6 × 6 = 36* e.g. *312 ÷ 3 is 100 + 4 as 100 × 3 = 300 and 4 × 3 = 12* Know tests for divisibility by 2, 3, 4, 5, 6, 9 and 25 Know square numbers and cube numbers Reduce fractions to their simplest form	Give remainders as whole numbers or as fractions 21 r2 4) 86 r 2 = 2/4 simplified to ½ Progress to more challenging times tables and the need to carry when using bus stop. 362 ÷ 7 = 5 1 r5 7 | 3 6 ¹2 Find non-unit fractions of large amounts ¾ of 144. Divide 144 by 4 = 36 then 36 x 3 = 108 Turn improper fractions into mixed numbers and vice versa Choose the most efficient method in any given situation	

Year 6			
	L.O. To use negative numbers in context and calculate intervals across zero N5 **L.O. To solve addition and subtraction multi-step problems in contexts C4** **L.O. To add fractions with different denominators and mixed numbers F4**		
	Mental calculation	**Written calculation**	**Default for ALL children**

Y6 +	Know by heart number bonds to 100 and use these to derive related facts e.g. *3·46 + 0·54* Derive, quickly and without difficulty, number bonds to 1000 Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally e.g. *34 000 + 8000* Add multiples of powers of 10 and near multiples of the same e.g. *6345 + 199* Add negative numbers in a context such as temperature where the numbers make sense Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 e.g. *4·5 + 6·3* e.g. *0·74 + 0·33* Add positive numbers to negative numbers e.g. *Calculate a rise in temperature or continue a sequence beginning with a negative number*	Use column addition to add numbers with up to 6 digits.  Use column addition to add decimal numbers with up to 3 decimal places. Highlight the importance of lining up the decimal points.  When confident progress onto adding whole numbers with decimal numbers and decimals with different numbers of digits after the decimal point. e.g. 1,457 + 2.8 =  Add mixed numbers and fractions with different denominators	Derive, swiftly and without difficulty, number bonds to 100 Use place value and number facts to add ‘friendly’ large or decimal numbers e.g. *3·4 + 6·6* e.g. *26 000 + 54 000* Use column addition to add numbers with up to 4-digits Use column addition to add pairs of 2-place decimal numbers

	L.O. To use negative numbers in context and calculate intervals across zero N5 **L.O. To solve addition and subtraction multi-step problems in contexts C4** **L.O. To subtract fractions with different denominators and mixed numbers F4**		
Y6 –	Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or 2-place decimal numbers using complementary addition and including money e.g. *10 – 3·65 as 0·35 + 6* e.g. *£50 – £34·29 as 71p + £15* Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places e.g. *467 900 – 3005* e.g. *4·63 – 1·02* Subtract multiples of powers of 10 and near multiples of the same Subtract negative numbers in a context such as temperature where the numbers make sense	Use column subtraction to subtract numbers with up to 6 digits. Progress onto regrouping or borrowing which we call 'stealing' at Hopton.  Use complementary addition or finding the difference for subtractions where the larger number is a multiple or near multiple of 1000 or 10 000 10,000 – 3678 = 3678 + 6000 + 300 + 20 + 2 = Use complementary addition for subtractions of decimal numbers with up to 3 places, including money Subtract mixed numbers and fractions with different denominators. Remind the children about finding the LCM (Lowest Common Multiple) also known as the LCD (Lowest Common Denominator)	Use number bonds to 100 to perform mental subtraction of numbers up to 1000 by complementary addition e.g. *1000 – 654 as 46 + 300 in our heads* Use complementary addition for subtraction of integers up to 10 000 e.g. *2504 – 1878* Use complementary addition for subtractions of 1-place decimal numbers and amounts of money e.g. *£7·30 – £3·55*

$$\frac{11}{15} - \frac{3}{5} = ?$$

$$\frac{11}{15} - \frac{3 \times 3}{5 \times 3}$$

$$\frac{11}{15} - \frac{9}{15} = \frac{11-9}{15} = \frac{2}{15}$$

When subtracting mixed numbers children are taught to convert the mixed number to an improper fraction first, by multiplying the whole number by the fraction denominator then adding the numerator.

Subtract Mixed Numbers

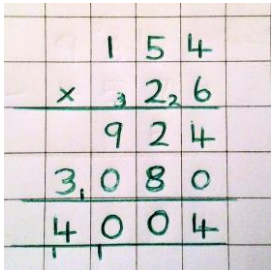
$9\frac{1}{2} - 5\frac{1}{4}$

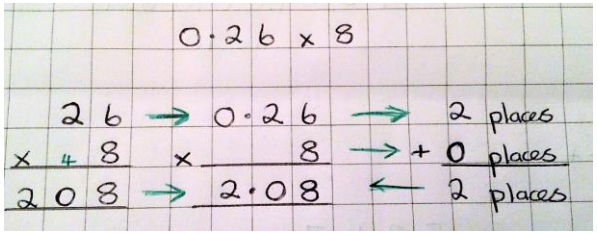
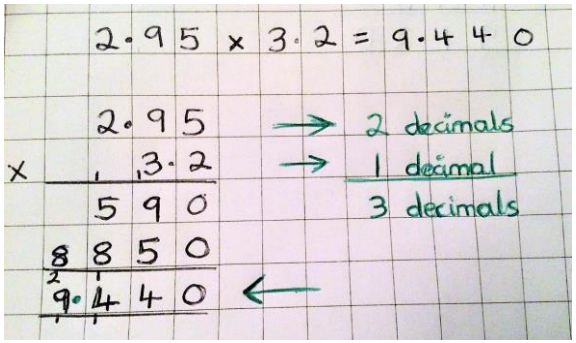
$= \frac{19}{2} - \frac{21}{4}$ Change to improper fractions

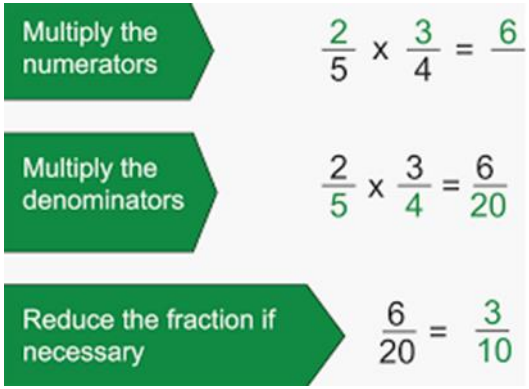
$= \frac{19 \times 2}{2 \times 2} - \frac{21}{4}$ Change to common denominator

$= \frac{38}{4} - \frac{21}{4}$ Subtract the numerators

$= \frac{17}{4} = 4\frac{1}{4}$ Change to mixed numbers

	L.O. To multiply numbers with up to 4 digits by 2 digits C7a **L.O. To multiply fractions simple pairs of proper fractions F5a** **L.O. To multiply one digit numbers with up to two decimal places by whole numbers F9b**		
Y6 **×**	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000 e.g. *234 × 1000 = 234 000* e.g. *0·23 × 1000 = 230* Identify common factors, common multiples and prime numbers and use factors in mental multiplication e.g. *326 × 6 is 652 × 3 which is 1956* Use place value and number facts in mental multiplication e.g. *4000 × 6 = 24 000* e.g. *0·03 × 6 = 0·18* Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 e.g. *28 × 25 is a quarter of 28 × 100 = 700* Use rounding in mental multiplication e.g. *34 × 19 as (34 × 20) – 34* Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning e.g. *3·6 × 4 is 12 + 2·4* e.g. *2·53 × 3 is 6 + 1·5 + 0·09* Double decimal numbers with up to 2 places using partitioning	Use short multiplication to multiply a 1-digit number by a number with up to 4 digits Use long multiplication to multiply a 2-digit number by a number with up to 4 digits e.g 154 x 26 =4004  Use short multiplication to multiply a 1-digit number by a number with 1 or 2 decimal places, including amounts of money. Children are told to ignore the decimal point when multiplying, but count how many decimal places are in each number being multiplied. Complete the calculation. Once they have completed the multiplication insert the decimal point in the correct place by counting back the number of decimal places in the original numbers. See image for 0.26 x 8 =	Know by heart all the multiplication facts up to 12 × 12 Multiply whole numbers and 1- and 2-place decimals by 10, 100 and 1000 Use an efficient written method to multiply a 1-digit or a teen number by a number with up to 4 digits by partitioning (grid method) Multiply a 1-place decimal number up to 10 by a number ≤ 100 using the grid method

	e.g. *36·73 doubled is double 36 (72) plus double 0·73 (1·46)*	 Higher ability children may move onto multiplying a decimal number by another decimal number.  Multiply fractions and mixed numbers by whole numbers _____ ***Example:*** $\frac{5}{8}\times 6=$ ***Solution:*** $\frac{5}{8}\times 6=\frac{5}{\cancel{8}_{4}}\times\frac{\cancel{6}^{3}}{1}=\frac{15}{4}=3\frac{3}{4}$	

		Multiply fractions by proper fractions  Use percentages for comparison and calculate simple percentages	
	L.O. To use long division to divide up to 4 digits by 2 digits, writing remainders as whole numbers, fractions and decimals C7b **L.O, To use short division to divide up to 4 digits by 1 or 2 digits writing remainders as whole numbers, fractions and decimals, rounding in the context of the question. C7c** **L.O. To divide proper fractions by whole numbers F5b** **L.O. To use written division methods in cases where the answer has up to 2 decimal places F9c**		
Y6 **÷**	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places Identify common factors, common multiples and primes numbers and use factors in mental division e.g. *438 ÷ 6 is 219 ÷ 3 which is 73* Use tests for divisibility to aid mental calculation	Use short division to divide a number with up to 4 digits by a 1-digit or a 2-digit number 432 ÷ 5 becomes $\begin{array}{r} 8\ 6\ \text{r}\ 2 \\ 5\overline{)\,4\ 3^{3}\ 2} \end{array}$ Answer: 86 remainder 2	Know by heart all the division facts up to 144 ÷ 12 Divide whole numbers by 10, 100, 1000 to give whole number answers or answers with up to 2 decimal places Use an efficient written method, involving subtracting powers of 10 times the divisor, to divide any number of up to 1000 by a number ≤ 12

	Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25 e.g. *628 ÷ 8 is halved three times: 314, 157, 78·5* Divide 1- and 2-place decimals by numbers up to and including 10 using place value e.g. *2·4 ÷ 6 = 0·4* e.g. *0·65 ÷ 5 = 0·13* e.g. *£6·33 ÷ 3 = £2·11* Halve decimal numbers with up to 2 places using partitioning e.g. *Half of 36·86 is half of 36 (18) plus half of 0·86 (0·43)* Know and use equivalence between simple fractions, decimals and percentages, including in different contexts Recognise a given ratio and reduce a given ratio to its lowest terms	Give remainders as whole numbers or as fractions or as decimals 496 ÷ 11 becomes 4 5 r 1 11 | 4 9 6 (5) Answer: $45\frac{1}{11}$ Use long division to divide 3-digit and 4-digit numbers by 'friendly' 2-digit numbers **Long division** 432 ÷ 15 becomes 2 8 r 12 15 | 4 3 2 3 0 0 1 3 2 1 2 0 1 2 Give remainders as whole numbers or as fractions or as decimals Divide a 1-place or a 2-place decimal number by a number ≤ 12 using multiples of the divisors Divide proper fractions by whole numbers	e.g. *836 ÷ 11 as 836 – 770 (70 × 11) leaving 66 which is 6 × 11, giving the answer 76* Divide a 1-place decimal by a number ≤ 10 using place value and knowledge of division facts