Rushey Green Primary School
Calculation Policy

Introduction

Children are introduced to the processes of calculation through practical, oral and mental activities. As they begin to understand the underlying ideas, they develop ways of recording to support their thinking and calculation methods, use particular methods that apply to special cases, and learn to interpret and use the signs and symbols involved. Over time children learn how to use models and images, such as empty number lines, to support their mental and informal written methods of calculation.

The overall aim is that when children leave primary school they:

- have a secure knowledge of number facts
- recall key number facts instantly – for example, all addition and subtraction facts for each number to at least 10, sums and differences of multiples of 10 and multiplication facts up to 12 x 12
- have a good understanding of the four operations
- are able to use this knowledge and understanding to carry out calculations mentally and to apply general strategies when using one-digit and two-digit numbers and particular strategies to special cases involving bigger numbers
- make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads
- 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 not be made to go onto the next stage if:

1) They are not ready i.e. they have not yet secured the pre-requisite skills
2) They are not confident enough yet to move onto the next strategy and need to learn to 'own' it more

Children should be encouraged to approximate their answers before calculating.

TOP TIP!! Children should be encouraged to consider if a mental calculation would be appropriate before using written methods i.e. always being encouraged to think 'Can I do this in my head?' first…..

Remember:

Every day is a mental mathematics day – ensure that children engage in sustained mental work each day (at least 10–15 minutes) to secure and develop knowledge, skills and understanding in mathematics. *Don't expect confidence in working mentally if practice, rehearsal and reasoning have not taken place*.

Hands-on learning is still important – provide appropriate practical equipment for children to use and manipulate, to help them to explore how and why things work and to learn to visualise, describe and represent what is in front of them. *Don't just talk about weighing scales, use one; using apparatus is better than imagining how it works*.

Seeing mathematics through models and images supports learning – help children to see how mathematics works and can be represented through physical objects, pictures or diagrams such as place-value cards, number sticks, number lines, representations of fractional parts. *Don't expect children to visualise and 'see' how something works if they have no models and images to draw from*.

Talking mathematics clarifies and refines thinking – give children the vocabulary and language of mathematics; provide activities and time for them to discuss mathematics, using this language. Teach children the precision of language, for example, using: prism, equals, factor and how to express their reasoning using language such as: if... then... , because, cannot be, never, sometimes, always. *Don't expect children to explain or provide reasons if they have no opportunity to use, develop and refine the language to do so*.

Make mathematics interesting – share your interest in mathematics with the children. Give children mathematics that engages them in: estimating and finding out about the number of bricks in the school building, testing out ideas such as when the sum of three consecutive whole numbers is a multiple of six, answering intriguing questions such as how many times their heart beats in ten minutes compared with an elephant or a mouse. *Don't expect children to be interested in mathematics if you don't share an interest and all their mathematics is routine and dull*.

Learning from mistakes should build up children's confidence – look out for mistakes and encourage children to recognise that making mistakes is something everyone does. Show children common errors and get them to identify and correct them. Encourage children to work with a partner and share their work. *Don't just tell children something is wrong; help them to see what went right and to identify when it went wrong*.

DCSF Securing Levels materials, 2009

EYFS

Non Negotiables for early number development (based on statements in Development Matters 2013)

- Providing opportunities for daily counting in real-life situations, ensuring pupils can:
  - Recite numbers in order and in relation to different sized sets or groups
  - See numerals linked to images of sets, actions and sounds (securing conservation)
  - Rehearse one-to-one correspondence
  - Learn to organise the objects they are counting by placing them in a line

- Daily practice of nursery rhymes and songs to develop memory skills, including using points of transition
- Link number development with stories
- Develop technical language acquisition – ensure that correct mathematical language is used, encouraged , explained and listed on planning
- Ensure that across a week there are opportunities planned within the daily provision for mathematical development and a clear balance between child-initiated and adult-led activities

Key Resources for teaching number:

1. **E.g. NUMICON** as the key visual for number

Key resources for counting:

- **Cubes, buttons, threading, cards, magnetic numbers, dominoes, shells, bricks, blocks, fruit, children!**

{INSERT PICTURES}

Photos of indoor and outdoor learning

Key Stage 1 - 2	
Progression of mental calculation strategies for **adding** whole numbers	Progression of mental calculation strategies for **subtracting** whole numbers
• **Counting on in ones and then 10, 5 and 2 using a number line and without** • **Count on from the largest number ('put the number in your head…')** • **Addition facts for all pairs of numbers with a total of up to at least 5 and corresponding subtraction facts** • **Know by heart all pairs/number bonds of numbers with a total of 10** • Doubles of numbers to at least 5 • Identify near doubles, using doubles already known (5 + 6) • Begin to bridge 10 when adding a single-digit number • **Know by heart all pairs/number bonds of numbers with a total of 20** • **Know by heart all pairs/number bonds of multiples of ten with a total of 100** • **Know all addition facts for all numbers up to 10** • Doubles of numbers to at least 10 and multiples of 10 to 100 • Identify near doubles, using doubles already known (40 + 41) • Derive quickly all pairs of multiples of 5 with a total of 100 • **Partition into tens and unit/ones, then recombine** • Doubles of all whole numbers to at least 20 • Doubles of multiples of 5 to 100 • Doubles of multiples of 50 to 500 • Identify near doubles, using doubles already known (80 + 79) • Bridge through a multiple of 10 and adjust • **Add 2–digit and larger numbers using partitioning into tens and units/ones, adding tens first** • Identify near doubles using doubles already known (150 + 160)	• **Counting back in ones and then 10, 5 and 2 using a number line and without, from a multiple of 1, 10, 5 or 2** • Know by heart all pairs of numbers with a total of 5 and corresponding subtraction facts • **Know addition facts for all pairs of numbers to 10 and corresponding subtraction facts** • **Partition into tens and unit/ones, then recombine** • Use known number facts and place value to subtract mentally • Find a difference by counting up from the smaller number • **Count back in repeated steps of 1, 10, 100** • **Subtract 2-digit numbers using partitioning into tens and units/ones, subtracting tens first**
Key resources:	**Please add ideas, resources, websites etc below**

Key stage 1-2	
Progression of mental calculation strategies for **multiplication** of whole numbers	Progression of mental calculation strategies for **division** of whole numbers
• Derive quickly: Year 1 - doubles of numbers to at least 5 **Year 2 - doubles of numbers to 10 and multiples of 10** Year 3 – 6; use doubling starting from known facts e.g. double any two-digit number by doubling tens first • Know by heart: **Year 2 - multiplication facts for 2, 5 and 10 times tables** Year 3 - multiplication facts for 2, 3, 4, 5, 8 and 10 times tables **Year 4 - all multiplication facts to 12 x 12** • Derive multiplication facts from known facts e.g.: ○ To multiply by 4, double and double again ○ To multiple by 5, multiple by ten and halve ○ To multiply by 20, multiply by 10 and double ○ Multiply by 25 by x 100 and finding a quarter ○ Find x 16 facts by doubling x 8 ○ Find x 12 facts by x10 + x2 ○ Find x 17 facts by x10 + x2 ○ Find sixths by halving thirds ○ Use closely related facts e.g. x 19 by x 20 and adjust • **To multiply by 10/100, shift the digits one/two places to the left** • Use factors e.g. 8 x 12 = 8 x 4 x 3 • **Use partitioning to multiply numbers to 20 x 1 digit number** • Use relationship between multiplication and division	• Derive quickly: Year 1 - doubles of numbers to at least 5 and corresponding halves **Year 2 - doubles of numbers to 10 and multiples of 10 and corresponding halves** Year 3 – 6; use halving/doubling starting from known facts e.g. double/halve any two-digit number by doubling/halving tens first • Know by heart: **Year 2 - multiplication facts for 2, 5 and 10 times tables and corresponding divisions** Year 3 - multiplication facts for 2, 3, 4, 5, 8 and 10 times tables and corresponding divisions **Year 4 - all multiplication facts to 12 x 12 and corresponding divisions** • Use known facts and place value to multiply and divide mentally, e.g.: ○ To divide by 4, halve and halve again (and for finding ¼) ○ To divide by 5, divide by ten and double (and for finding 1/5) ○ To divide by 20, divide by 10 and halve • **To divide by 10/100, shift the digits one/two places to the left** • **Understand that division can result in remainders and can be expressed in different forms**
Key resources:	**Please add ideas, resources, websites etc below**

Written methods

The aim is that children use mental methods when appropriate, but for calculations that **they cannot do in their heads** they use an efficient written method accurately and with confidence. Children are entitled to be taught and to acquire secure mental methods of calculation and one efficient written method of calculation for each of the four operations (addition, subtraction, multiplication and division) which they know they can rely on when mental methods are not appropriate.

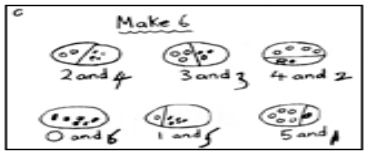
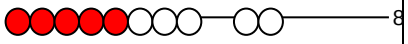
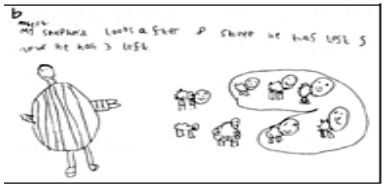
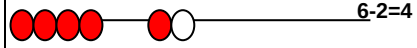
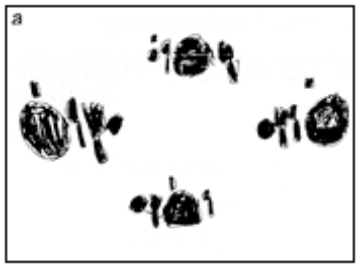
There are advantages in using standard written methods for calculations:

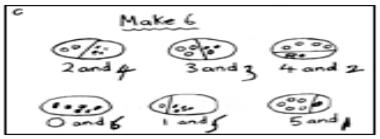
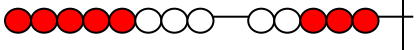
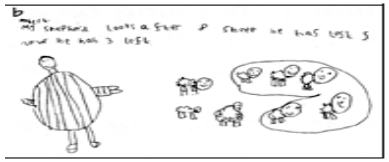
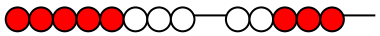
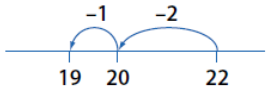
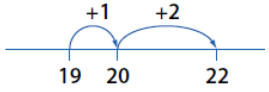
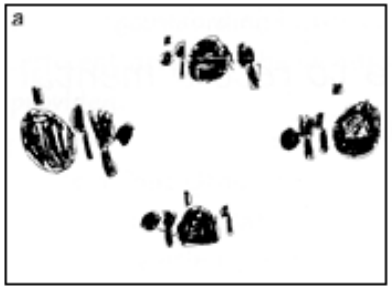
- They will always give the correct answer if applied correctly;
- They are efficient;
- They can be applied to any numbers, although they are not necessarily the best method for all numbers even if large;
- Eventually, when a standard method is fully understood, it is possible to carry it out automatically, so that concentration can be directed towards the development of new ideas in which that particular calculation plays a minor role.

However, their condensed standard form can be difficult to understand. Because the methods are condensed, they do not easily display the underlying mathematical rules that are being used. Children are prone to error when they use mechanically methods they do not fully understand.

Teaching Written Calculations, QCA 1999

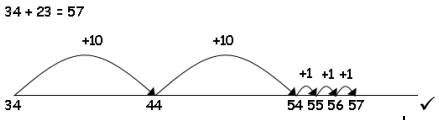
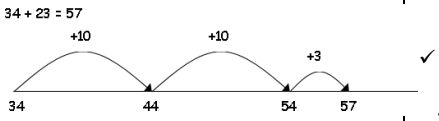
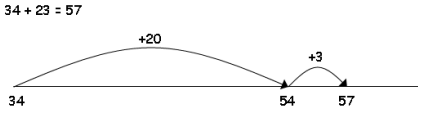
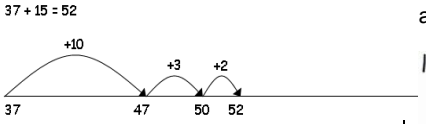
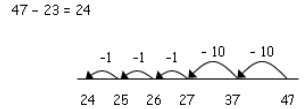
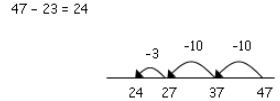
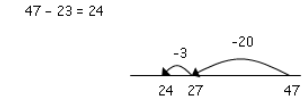
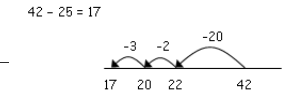
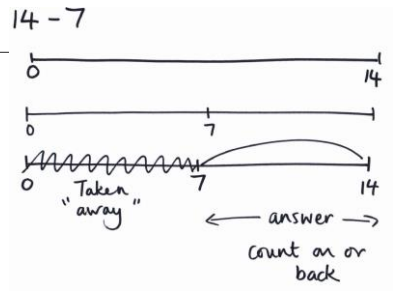
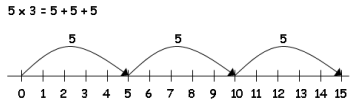
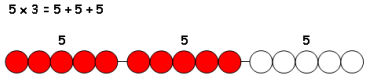
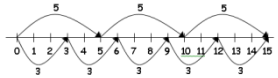
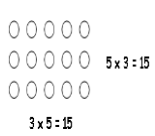
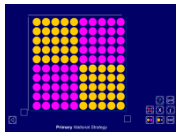
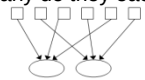
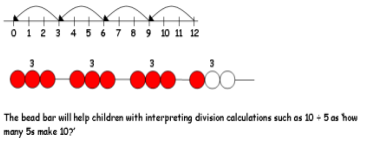
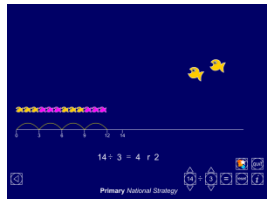
The tables below set out the ***expected*** models and images, and **informal and formal** methods of calculation for teachers to use, model and demonstrate to pupils at each stage of learning:

	Addition	Subtraction	Multiplication	Division
Reception	Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.  **EXPECTATION: all numbers are presented as soon as possible on a line to show the relationship between them** Bead strings or bead bars can be used to illustrate addition  They use numberlines and practical resources to support calculation and teachers *demonstrate* the use of the numberline. 	Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.  Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.  They use number lines and practical resources to support calculation. Teachers *demonstrate* the use of the number line. **TOP TIP; RECOGNISE THAT THERE ARE AT LEAST 5 CONTEXTUAL INTERPETATIONS OF SUBTRACTION THAT NEED TO BE TAUGHT! (See Derek Haylock, Understanding mathematics for Young Children'). AVOID OVER-EMPHASIS ON 'TAKE-AWAY'**	Children will experience **equal groups** of objects. They will count in 2s and 10s and begin to count in 5s. They will work on practical problem solving activities involving equal sets or groups. e.g. laying the table for the 3 bears and goldilocks  Begin to introduce children to the visual images of arrays – using real-life examples (brick work, paving slabs, windows in a building, anything with a repeating pattern in rows and columns!)	Children will understand **equal groups** and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.  Count in 2's to find out how many socks are on the washing line: 

	Addition	Subtraction	Multiplication	Division
Year 1	Using pictures  Bead strings or bead bars can be used to illustrate addition including bridging through ten by counting on 2 then counting on 3.  They use number lines and practical resources to support calculation and teachers *demonstrate* the use of the number line. 2 + 5 = 7 2 count on 5 5 + 2 = 7 5 count on 2 Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones. Children are given practical opportunities to explore the meaning and use of the mathematical symbols ' + ', '- ' and ' = ' Use concrete objects and pictorial representations to solve one-step problems and missing number problems such as 7 = ☐ – 9.	Using pictures  Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.  **13-5=8** Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones. The number line should also be used to show that 6 - 3 means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart. 22 – 3  22 – 19 = 3  	Children will experience equal groups of objects.  They will count in 2s, 5s and 10s. They will work on practical problem solving activities involving equal sets or groups, e.g. laying the table for the 3 bears and goldilocks 	Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.  Count in 2's to find out how many socks are on the washing line: 

Key resources/key vocabulary:

Put together, add, altogether, total, take away, distance between, difference between, more than and less than (from Non-Statutory Guidance, new curriculum 2014)

	Addition	Subtraction	Multiplication	Division
Year 2	Children will begin to use 'empty number lines' themselves starting with the larger number and counting on. ✓ First counting on in tens and ones.  ✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact 4 + 3 = 7).  ✓ Followed by adding the tens in one jump and the units in one jump.  ✓ Bridging through ten can help children become more efficient.  Children should be shown how to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. When the child is showing confidence in mental strategies, begin to develop column addition. Start by adding the significant number first (tens then units) as they would in a mental strategy. Then demonstrate working with the least significant digits first (different to mental strategies and therefore requires modelling)	Children will begin to use empty number lines to support calculations. **Counting back:** ✓ First counting back in tens and ones.  ✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4).  ✓ Subtracting the tens in one jump and the units in one jump.  ✓ Bridging through ten can help children become more efficient.  Counting on: The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'. 	Children will develop their understanding of multiplication and use jottings to support calculation: ✓ **Repeated addition** 3 times 5 is 5 + 5 + 5 = 15 or 3 lots of 5 or 5 x3 Repeated addition can be shown easily on a number line:  and on a bead bar:  ✓ **Commutativity** Children should know that 3 x 5 has the same answer as 5 x 3. This can also be shown on the number line.  ✓ **Arrays** Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.   Relate x2 to doubling and relate multiplication to fractions	Children will develop their understanding of division and use jottings to support calculation ✓ **Sharing equally** 6 sweets shared between 2 people, how many do they each get?  **The emphasis in Year 2 should be on grouping.** ✓ **Grouping or repeated subtraction** There are 6 sweets, how many people can have 2 sweets each?  ✓ **Repeated subtraction using a number line or bead bar** 12 ÷ 3 = 4   ✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations** ☐ ÷ 2 = 4 20 ÷ △ = 4 ☐ ÷ △ = 4 **NOTE: All teachers read** 12 ÷ 3 = ? **as 'How <u>many groups of 3</u> are in 12?** Relate ÷2 to halving and relate division to fractions

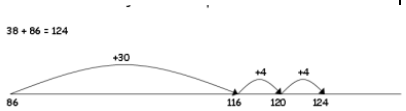
67 + 24 11 (7 + 4) 80 (60 + 20) 91 267 + 85 12 (7 + 5) 140 (60 + 80) 200 352 Support this as necessary with Dienes apparatus			
Key resources/key vocabulary			

Year 3

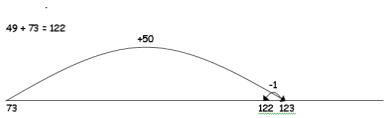
Addition

Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

Count on from the largest number irrespective of the order of the calculation.



Compensation



Children continue to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Secure column methods using the least significant digits first (different to mental strategies and therefore requires modelling)

67	267
+ 24	+ 85
11 (7 + 4)	12 (7 + 5)
80 (60 + 20)	140 (60 + 80)
91	200
	352

Continue to refine column addition from the expanded method to carry below the line and with larger numbers (up to 3-digits) – ONLY progress if it is clear the pupil understands how this method works, and ensure that it does NOT replace their efficient mental calculation strategies:

625	783	367
+ 48	+ 42	+ 85
673	825	452
1	1	11

Subtraction

Children will continue to use empty number lines with increasingly large numbers.

Children will begin to use informal pencil and paper methods (jottings).

NOTE: Ensure that the 5 different structures for subtraction are explored through a range of contexts (see Derek Haylock)

Partitioning and decomposition

- Partitioning – demonstrated using arrow cards
- Decomposition - base 10 materials

89 = 80 + 9
- 57 = 50 + 7
= 30 + 2 = 32

Begin to exchange.

71 = =
- 46

Step 1 70 + 1
- 40 + 6

Step 2 60 + 11
- 40 + 6
20 + 5 = 25

The calculation should be read as e.g. take 6 from 1.

This would be recorded by the children as

60
7 0 + 1 1
- 4 0 + 6
2 0 + 5 = 25

When pupils are confident with the expanded method move to compact columnar subtraction with 2-digit numbers, then extend to 3-digit:

754 =
- 86

Step 1 700 + 50 + 4
- 80 + 6

Step 2 700 + 40 + 14 *(adjust from T to U)*
- 80 + 6

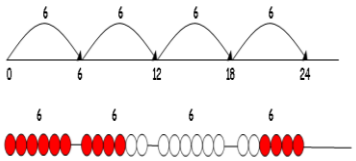
Step 3 600 + 140 + 14 *(adjust from H to T)*
- 80 + 6
600 + 60 + 8 = 668

This would be recorded by the children as

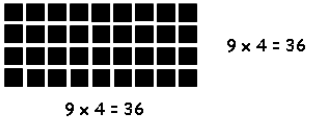
600 140
7 0 0 + 5 0 + 1 4
- 80 + 6
600 + 60 + 8 = 668

Multiplication

Children will continue to use:
Repeated addition
4 times 6 is 6 + 6 + 6 + 6 = 24 or
4 lots of 6 or 6 x 4
Children should use number lines or bead bars to support their understanding.



Arrays; Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.

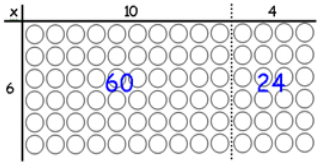


Scaling
e.g. Find a ribbon that is 4 times as long as the blue ribbon

Using symbols to stand for unknown numbers to complete equations using inverse operations
☐ x 5 = 20 3 x △ = 18
☐ x O = 32

Develop reliable written methods:

Partitioning:
14 x 6 demonstrated in a grid:



(6 x 10) + (6 x 4)
60 + 24
84

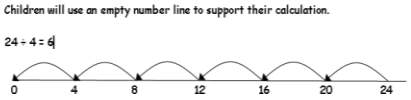
Leading to:

Division

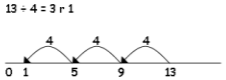
Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

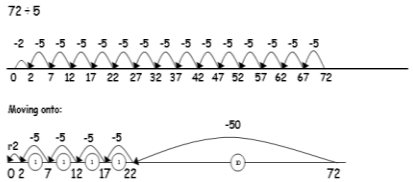
✓ **Repeated subtraction using a number line**



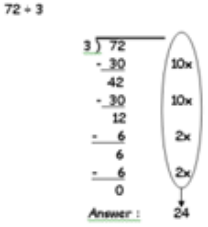
Children should also move onto calculations involving remainders.



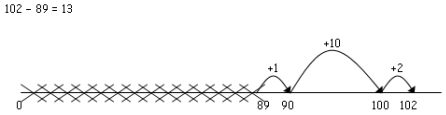
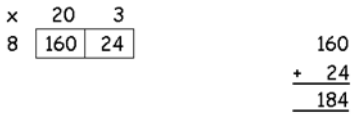
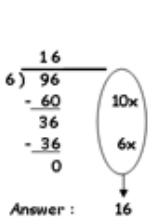
Children should then develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s – numbers with which the children are more familiar.

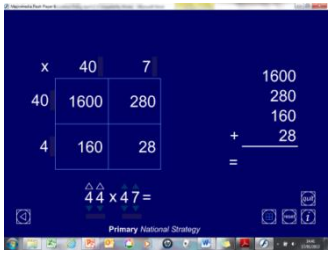


Then onto the vertical method:
Short division TU ÷ U:



Leading to subtraction of other multiples:

		NB: Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc. counting on using a number line should be used.  	23 x 8 Children should approximate first: 23 x 8 is approximately 25 x 8 = 200  38 x 5 = (30 x 5) + (8 x 5) = 150 + 40 = 190 And finally refined to: 24 × 6 becomes 2 4 × 6 1 4 4 2 Answer: 144	 When children are assessed as fully understanding the processes involved here, introduce the final stage of short division, recognising that the language involved can be confusing (e.g. with 98 ÷ 7, asking 'how many 7's are in 9 does not relate to the value of the 9, which is of course 90) 98 ÷ 7 becomes 1 4 2 7 9 8 Answer: 14
Key Resources/key vocabulary				

	Addition	Subtraction	Multiplication	Division
Year 4	✓ Carry below the line. 625 + 48 = 673 (1) 783 + 42 = 825 (1) 367 + 85 = 452 (11) and 789 + 642 becomes 7 8 9 + 6 4 2 1 4 3 1 1 1 Answer: 1431 When secure, extend to 4-digit numbers *Using similar methods, children will:* ✓ *add several numbers with different numbers of digits;* ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;* ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.* **TOP TIP: ALWAYS present calculations horizontally so that the child can consider the best mental and/or written methods**	✓ **Decomposition** 614 1 7 8 4 - 8 6 6 6 8 and 932 – 457 becomes 8 12 1 9 3 2 – 4 5 7 4 7 5 Answer: 475 When secure, extend to 4-digit numbers *Children should:* ✓ *be able to subtract numbers with different numbers of digits;* ✓ *using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;* ✓ *know that decimal points should line up under each other.* £8.95 = 8 + 0.9 + 0.05 -£4.38 - 4 + 0.3 + 0.08 = 8 + 0.8 + 0.15 (adjust from T to U) - 4 + 0.3 + 0.08 4 + 0.5 + 0.07 = £4.57 leading to 1 8.95 - 4.38 **TOP TIP: ALWAYS present calculations horizontally so that the child can consider the best mental and/or written methods**	Continue to refine formal methods for TU x U, returning to the partitioning/grid method when necessary to reinforce understanding 24 × 6 becomes 2 4 × 6 1 4 4 2 Answer: 144 **Extend when ready to working with 3-digit numbers HTU x U**(Short multiplication – multiplication by a single digit) **Grid method**  346 x 9 Children should approximate first 346 x 9 is approximately 350 x 10 = 3500 × 300 40 6 9 2700 360 54 2700 + 360 + 54 3114 1 1 Leading to: 342 × 7 becomes 3 4 2 × 7 2 3 9 4 2 1 Answer: 2394	Children will continue to use written methods to solve short division TU ÷ U and extend to HTU ÷ U **Short division HTU ÷ U** 147 ÷ 7 7 ⟌ 1 4 7 (2 1) Allow children to continue to look for efficient mental strategies, depending on the context and range of numbers Where necessary, return to the expanded (chunking) method to secure understanding and then revisited short method of recording.

Key Resources/key vocabulary

	Addition	Subtraction	Multiplication	Division
Year 5	Children should refine formal written method for addition and extend to numbers with more than four digits. 3587 + 675 4262 1 1 1 *Using similar methods, children will:* ✓ *add several numbers with different numbers of digits, including decimals;* ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*	Children should refine formal written method for addition and extend to numbers with more than four digits. 5 13 1 ~~6~~467 - 2684 3783 *Children should:* ✓ *be able to subtract numbers with different numbers of digits, including decimals;* ✓ *know that decimal points should line up under each other*	**Extend methods to ThHTU x U, and introduce long multiplication for TU x TU** (Long multiplication – multiplication by more than a single digit) 72 x 38 Children should approximate first 72 x 38 is approximately 70 x 40 = 2800 × 70 2 30 2100 60 8 560 16 2100 + 560 + 60 + 16 2736 Leading to: 24 × 16 becomes 2 2 4 × 1 6 2 4 0 1 4 4 3 8 4 Answer: 384	**Extend methods to ThHTU ÷ U and interpret remainders appropriately for the context** Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. Any remainders should be shown as fractions, as decimals or by rounding
Key Resources/key vocabulary				

	Addition	Subtraction	Multiplication	Division
Year 6	Children should refine and extend the columnar methods to number with any number of digits. Maintain their fluency through practice of mental calculations with increasingly large numbers and their multiplication tables		**ThHTU x U** (Short multiplication – multiplication by a single digit) 4346 x 8 Children should approximate first 4346 x 8 is approximately 4346 x 10 = 43460 × 4000 300 40 6 8 | 32000 | 2400 | 320 | 48 32000 + 2400 + 320 + 48 34768 **HTU x TU** (Long multiplication – multiplication by more than a single digit) 372 x 24 Children should approximate first 372 x 24 is approximately 400 x 25 = 10000 × 300 70 2 20 | 6000 | 1400 | 40 4 | 1200 | 280 | 8 6000 + 1400 + 1200 + 280 + 40 + 8 8928 Contracted method for long multiplication is introduced for HTU x TU. 612 x 24 2448 12240 14688 HTU is multiplied by U HTU multiplied by T (0 is added) Total is found	**Long division TU ÷ TU and HTU ÷ TU** (Division with more than a single digit divisor) Expanded method (chunking): 972 ÷ 36 27 36) 972 - 720 (20x) 252 - 252 (7x) 0 Answer: 27 Leading to contracted long division with different interpretations for remainders: 432 ÷ 15 becomes 2 8 r 12 1 5 | 4 3 2 3 0 0 1 3 2 1 2 0 1 2 Or 432 ÷ 15 becomes 2 8 1 5 | 4 3 2 3 0 0 15×20 1 3 2 1 2 0 15×8 1 2 12/15 = 4/5 Or 432 ÷ 15 becomes 2 8 · 8 1 5 | 4 3 2 · 0 3 0 ↓ 1 3 2 1 2 0 ↓ 1 2 0 1 2 0 0
Key Resources/key vocabulary				