St. Edmund's Catholic Primary School

'Together we learn and grow through worship and celebration'

Calculation Policy

Committee responsible for policy	Curriculum and Achievement
Coordinator	Terri Meldon
Statutory/Non-statutory	Non STATUTORY
Frequency of Review	Free to determine – every 3 years or earlier if required
Date of last review Approved by **Staff/ SLT/**Committee/FGB	February 2014
Date of next review	**February 2017**
Purpose of policy	To understand the teaching requirements for mathematics at St Edmund's school
Consultation	Staff
Links to other policies	All other subject policies Curriculum, Marking, Planning

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
- 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
- are able to use a calculator effectively, using their mental skills to monitor the process, check the steps involved and decide if the numbers displayed make sense

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Teaching Mathematics at St Edmund's

Remember:

Every day is a mental mathematics day – ensure that children engage in sustained mental work each day (at least 10 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

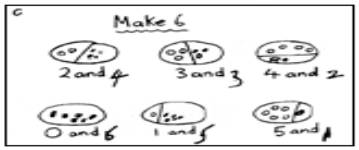
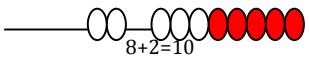
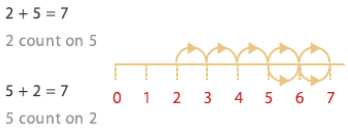
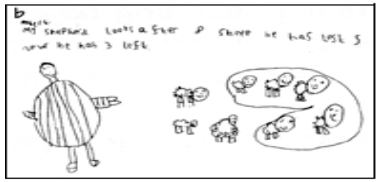
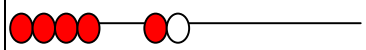
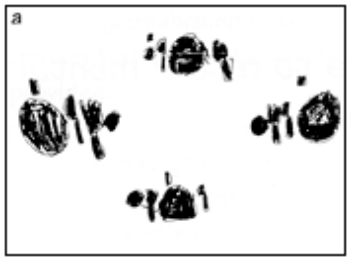
Mental calculation strategies for **adding** whole numbers	Mental calculation strategies for **subtracting** whole numbers
• **Counting on in ones and then 10, 5 and 2 using a number line and without** • **Count on from the largest number ('put the number in your head…')** • **Addition facts for all 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 any number in a variety of ways, including but not exclusively into tens and 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 any number in a variety of ways, including but not exclusively into tens and 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**

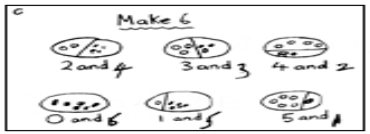
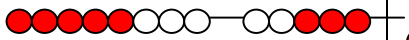
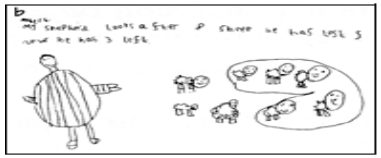
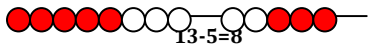
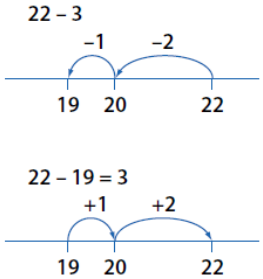
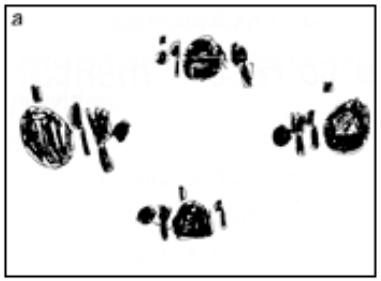
Mental calculation strategies for **multiplying** of whole numbers	Mental calculation strategies for **dividing** whole numbers
• Derive quickly: Year 1 - doubles of numbers to at least 5 Year 2 - doubles of numbers to 10 and multiples of 10 Year 3 – use doubling starting from known facts e.g. double 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, 6, 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 10/100/1000, shift the digits one/two/three places to the left (including those with decimals) • Use factors e.g. 8 x 12 = 8 x 4 x 3 and recognise factor pairs • Use partitioning to multiply numbers to 20 by a one digit number • Use and understand relationship between multiplication and division • Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers	• 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 division facts Year 3 - multiplication facts for 2, 3, 4, 5, 6 and 10 times tables and corresponding division facts Year 4 - all multiplication facts to 12 x 12 and corresponding division facts • 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 to 1/5) To divide by 20, divide by 10 and halve • To divide by 10/100/1000, shift the digits one/two/three places to the left (including those with decimals) • Understand that division can result in remainders and can be expressed in different forms

Written methods

Our 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.

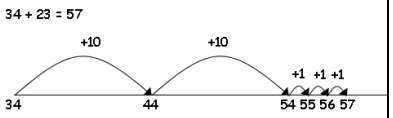
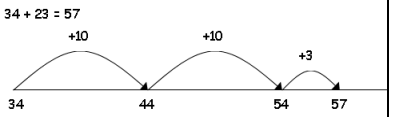
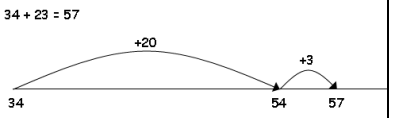
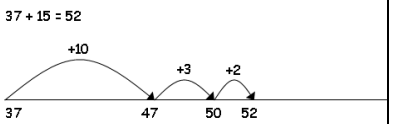
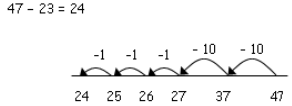
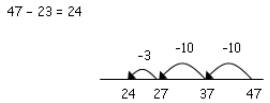
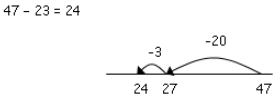
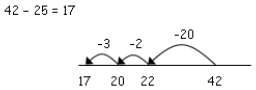
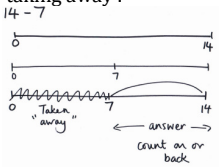
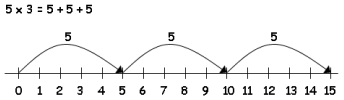
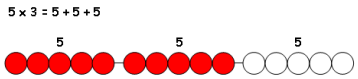
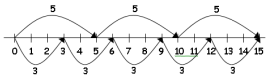
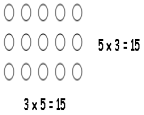
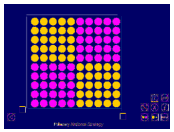
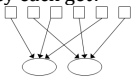
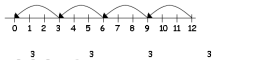
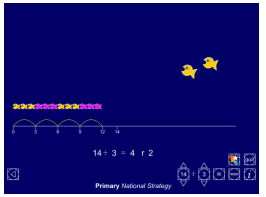
The tables below set out the ***expected*** models and images, and informal and formal methods of calculation for teachers to use, model and demonstrate to pupils at each stage of learning:

	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.  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.	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 	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.	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.  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.  	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 	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: 

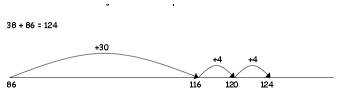
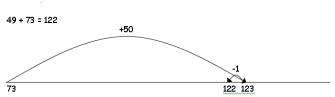
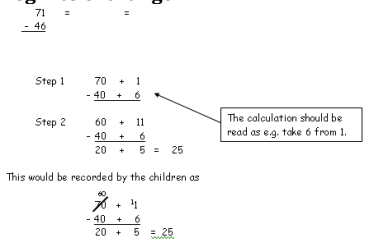
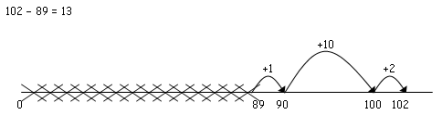
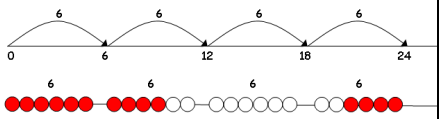
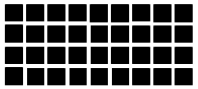
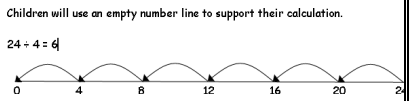
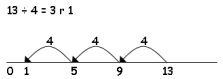
Calculating objectives for Year 1 **Primary Framework** **2014 National Curriculum**

- Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number
- Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number
- Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences
- Add and subtract one-digit and two-digit numbers to 20, including zero
- Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

	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 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.  	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?  *Sharing is covered but 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  The bead bar will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'  ✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations** ☐ ÷ 2 = 4 20 ÷ △ = 4 ☐ ÷ △ = 4

Calculating objectives in Year 2 **Primary Framework 2014 National Curriculum**

- Represent repeated addition and arrays as multiplication, and sharing and repeated subtraction (grouping) as division; use practical and informal written methods and related vocabulary to support multiplication and division, including calculations with remainders
- Use the symbols +, –, ×, ÷ and = to record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence (e.g. □ ÷ 2 = 6, 30 – □ = 24)
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot

	Addition	Subtraction	Multiplication	Division
Year 3	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 will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. Adding the least significant digits first (different to mental strategies and therefore requires modelling) 67 + 24 11 (7 + 4) 80 (60 + 20) 91 267 + 85 12 (7 + 5) 140 (60 + 80) 200 352	Children will continue to use empty number lines with increasingly large numbers. Children will begin to use informal pencil and paper methods (jottings). **Partitioning and decomposition** • Partitioning – demonstrated using arrow cards • Decomposition - base 10 materials **NOTE**: When solving the calculation 89 – 57, children should know that 57 **does NOT EXIST AS AN AMOUNT,** it is what is being subtracted from the other number. Therefore, children would need to count out only the 89, then 'remove' 57 89 = 80 + 9 - 57 50 + 7 30 + 2 = 32 **Begin to exchange.**  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.  	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.  9 x 4 = 36 9 x 4 = 36 **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 ○ = 32 **Partitioning** 38 x 5 = (30 x 5) + (8 x 5) = 150 + 40 = 190	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.  ✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations** 26 ÷ 2 = ☐ 24 ÷ △ = 12 ☐ ÷ 10 = 8

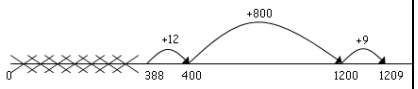
Calculating Objectives in Year 3 **Primary Framework 2014 National Curriculum**

- Develop and use written methods to record, support or explain addition and subtraction of two-digit and three-digit numbers
- Use practical and informal written methods to multiply and divide two-digit numbers (e.g. 13 × 3, 50 ÷ 4); round remainders up or down, depending on the context
- Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences
- Add and subtract numbers mentally, including: a three-digit number and one, a three-digit number and tens, a three-digit number and hundreds
- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods

	Addition	Subtraction	Multiplication	Division
Year 4	✓ Carry below the line. 625 + 48 = 673 (1) 783 + 42 = 825 (1) 367 + 85 = 452 (11) *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.*	✓ **Partitioning and decomposition** 754 − 86 = Step 1: 700 + 50 + 4 − 80 + 6 Step 2: 700 + 40 + 14 − 80 + 6 *(adjust from T to U)* Step 3: 600 + 140 + 14 − 80 + 6 *(adjust from H to T)* 600 + 60 + 8 = 668 This would be recorded by the children as 600 140 700 + 50 + 14 − 80 + 6 600 + 60 + 8 = 668 ✓ **Decomposition** 614 1 ~~7~~~~8~~4 − 86 668 *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 − £4.38 = 8 + 0.9 + 0.05 − 4 + 0.3 + 0.08 = 8 + 0.8 + 0.15 − 4 + 0.3 + 0.08 *(adjust from T to U)* 4 + 0.5 + 0.07 = £4.57 leading to 1 8.95 − 4.38	Children will continue to use arrays where appropriate leading into the grid method of multiplication. 6 × 14: 10 and 4; 6 × 10 = 60, 6 × 4 = 24 (6 × 10) + (6 × 4) 60 + 24 84 ✓ **Grid method** **TU x U** (Short multiplication – multiplication by a single digit) 23 x 8 Children will approximate first 23 x 8 is approximately 25 x 8 = 200 × 20 3 8 160 24 160 + 24 184 × 40 7 40 1600 280 4 160 28 1600 280 160 + 28 = 44 x 47 =	Children will 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. 72 ÷ 5 -2 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 -5 0 2 7 12 17 22 27 32 37 42 47 52 57 62 67 72 Moving onto: -50 r2 0 2 7 12 17 22 72 Then onto the vertical method: **Short division TU ÷ U** 72 ÷ 3 3) 72 − 30 (10x) 42 − 30 (10x) 12 − 6 (2x) 6 − 6 (2x) 0 Answer : 24 Leading to subtraction of other multiples. 96 ÷ 6 1 6 6) 96 − 60 (10x) 36 − 36 (6x) 0 Answer : 16 Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2. 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.

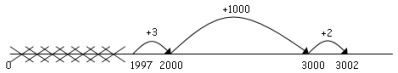
Calculating objectives in Year 4 **Primary Framework 2014 National Curriculum**

- Refine and use efficient written methods to add and subtract two-digit and three-digit whole numbers and £.p
- Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number, including division with remainders (e.g. 15 × 9, 98 ÷ 6)
- Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

	Addition	Subtraction	Multiplication	Division
Year 5	Children should extend the carrying method to numbers with at least four digits. 3587 + 675 = 4262 (1 1 1) 587 + 475 = 1062 (1 1) *Using similar methods, children will:* ✓ *add several numbers with different numbers of digits;* ✓ *begin to add two or more decimal fractions with up to three digits and the same number of decimal places;* ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*	**Partitioning and decomposition** Step 1: 754 = 700 + 50 + 4; − 286 = − 200 + 80 + 6 Step 2: 700 + 40 + 14 − 200 + 80 + 6 *(adjust from T to U)* Step 3: 600 + 140 + 14 − 200 + 80 + 6 = 400 + 60 + 8 = 468 *(adjust from H to T)* This would be recorded by the children as: 600 140 700 + 50 + 14 − 200 + 80 + 6 = 400 + 60 + 8 = 468 **Decomposition** 754 (614 1) − 286 = 468 *Children should:* ✓ *be able to subtract numbers with different numbers of digits;* ✓ *begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;* ✓ *know that decimal points should line up under each other* 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. 1209 − 388 = 821  	**Grid method** **HTU x U** (Short multiplication – multiplication by a single digit) 346 x 9 Children will approximate first 346 x 9 is approximately 350 x 10 = 3500 × 300 40 6; 9	2700	360	54 2700 + 360 + 54 = 3114 (1 1) **TU x TU** (Long multiplication – multiplication by more than a single digit) 72 x 38 Children will approximate first 72 x 38 is approximately 70 x 40 = 2800 × 70 2; 30	2100	60; 8	560	16 2100 + 560 + 60 + 16 = 2736 (1) *Using similar methods, they will be able to multiply decimals with one decimal place by a single digit number, approximating first. They should know that the decimal points line up under each other.* e.g. 4.9 x 3 Children will approximate first 4.9 x 3 is approximately 5 x 3 = 15 × 4 0.9; 3	12	2.7 12 + 2.7 = 14.7 Children will be introduced to methods for long multiplication: 24 × 16 becomes: 24 × 16 = 384 124 × 26 becomes: 124 × 26 = 3224 124 × 26 becomes: 124 × 26 = 3224	Children will continue to use written methods to solve short division TU ÷ U. Children can start to subtract larger multiples of the divisor, e.g. 30x **Short division HTU ÷ U** 196 ÷ 6 32 r 4 6) 196 − 180 (30x) 16 − 12 (2x) 4 Answer : 32 remainder 4 or 32 r 4 Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2. 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. **Long division HTU ÷ TU** (Division with more than a single digit divisor) 972 ÷ 36 27 36) 972 − 720 (20x) 252 − 252 (7x) 0 Answer: 27 Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10 the answer should be shown as 32/10 which could then be written as $3\ ^{1}/_{5}$ in its lowest terms.

Calculating Objectives in Year 5 **Primary Framework 2014 National Curriculum**

- Use efficient written methods to add and subtract whole numbers and decimals with up to two places
- Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 or 1000
- Refine and use efficient written methods to multiply and divide HTU × U, TU × TU, U.t × U, HTU ÷ U and HTU ÷ TU
- Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

	Addition	Subtraction	Multiplication	Division
Year 6	Children should extend the carrying method to number with any number of digits. 6584 + 5848 = 12432 (1 1 1) 7648 + 1486 = 9134 (1 1 1) Most significant quantities should be written first. *Using similar methods, children will* ✓ *add several numbers with different numbers of digits;* ✓ *begin to add two or more decimal fractions with up to four digits and either one or two decimal places;* ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71.*	**Decomposition** 5131 6467 - 2684 3783 *Children should:* ✓ *be able to subtract numbers with different numbers of digits;* ✓ *be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;* ✓ *know that decimal points should line up under each other.* 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. 3002 – 1997 = 1005  	**ThHTU x U** (Short multiplication – multiplication by a single digit) 4346 x 8 Children will approximate first 4346 x 8 is approximately4346x10=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 will approximate first 372 x 24 is approximately 400x25=10000 × 300 70 2 20 6000 1400 40 4 1200 280 8 6000 + 1400 + 1200 + 280 + 40 + 8 = 8928 *Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.* *For example:* 4.92 x 3 Children will approximate first 4.92 x 3 is approximately 5 x 3 = 15 × 4 0.9 0.02 3 12 2.7 0.06 12 + 0.7 + 0.06 = 12.76 Alternative method for long multiplication is continued for HTU x TU. Children will first approximate answer. HTU is multiplied by U HTU multiplied by T (0 is added) Total is found 612 x 24 2448 12240 14688	Children will continue to use written methods to solve **short division** TU ÷ U and HTU ÷ U moving on to compact method when ready. Extend to decimals with up to one decimal place. Children should know that decimal points line up under each other. Children should make sensible decisions about the interpretation of the remainder. 5)95 = 19 4)9142.0 = 23.5 **Long Division** Children continue to use written methods to solve HTU ÷ TU Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other. 972 ÷ 36 27 36) 972 - 720 (20x) 252 - 252 (7x) 0 Answer: 27 87.5 ÷ 7 12.5 7) 87.5 - 70.0 (10x) 17.5 - 14.0 (2x) 3.5 - 3.5 (0.5x) 0 Answer : 12.5 Some children will use traditional division. Long division 432 ÷ 15 becomes 15 | 432 = 28 r 12 300 132 120 12 Answer: 28 remainder 12 432 ÷ 15 becomes 15 | 432 = 28 4/5 300 (15×20) 132 120 (15×8) 12 Answer: 28 4/5 432 ÷ 15 becomes 15 | 432.0 = 28.8 300 132 120 120 0 Answer: 28.8

Calculating Objectives in Year 6 **Primary Framework 2014 National Curriculum**

- Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by a one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer and by numbers with up to 2 decimal places.
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context