Calculation Policy

Updated November 2015

ACTIVE LEARNING

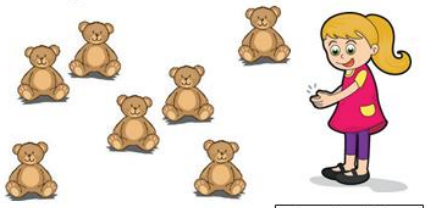
DOING / THINKING / UNDERSTANDING

NUMBER/CALCULATION OVERVIEW - EYFS
By the end of the year, children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

See Abacus website for Reception Mathematics Policy

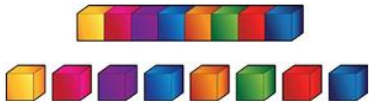
EYFS	
Counting	Abacus images

How many in a set?



Seven hand claps

Count, matching one-to-one



Conservation of number

Match numerals to a set of objects, sounds or images

Estimate, and encourage estimation, within a range

Subitise

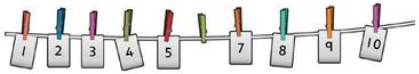
e.g. know there are 4 without counting

Numbers in a line or sequence

Recognise numerals

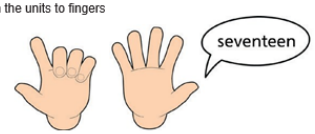
Count along a number line or track

Spot missing numbers in the line



Chant numbers in order to 10 and 20

Match the units to fingers



Chant numbers in order to 100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Place value

Understand 'teen' numbers (10 to 20)

Begin to recognise 2-digit numbers

Begin to count in 10s

EYFS	
Addition	Abacus images

Counting on

Count on one more, saying the next number

7 + 1 = 8

Count on 2 or 3 or 4 more from any number up to 10

5 + 3 = 8

Number bonds

Subitise

Split sets into bonds

4 + 2 = 6

4 + 3 = 7

Make small amounts

EYFS	
Subtraction	Abacus images

Counting back

Count back 1 less, saying the number before

7 – 1 = 6

Take away 2 or 3 or 4 from any number up to 10

5 – 2 = 3

7 – 1 = 6

Number bonds

Subitise

Split sets into bonds

6 – 2 = 4

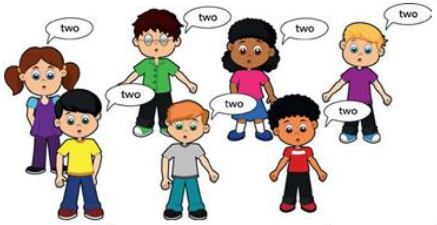
7 – 4 = 3

Use money

EYFS	
Multiplication and division	Abacus images

Counting in steps ('clever counting')

Begin to count in 2s



Two, four, six...

Begin to count in 5s

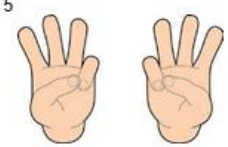
Five, ten, fifteen, twenty...

Begin to count in 10s

Ten, twenty, thirty...

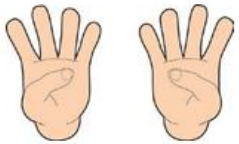
Doubling and halving

Double numbers to 5



Double 3 is 6

Halve even numbers to 10



Half of 8 is 4

Sharing

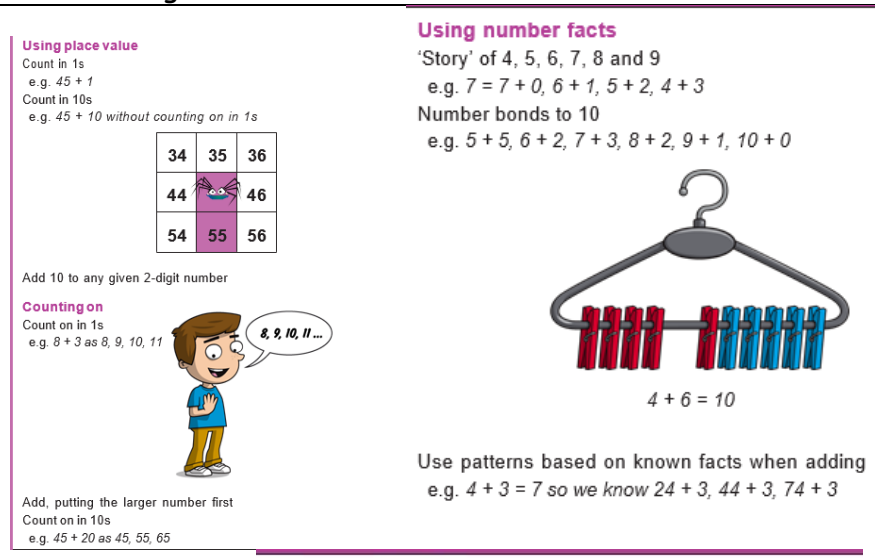
Share multiples of 2 and 4 into halves and quarters

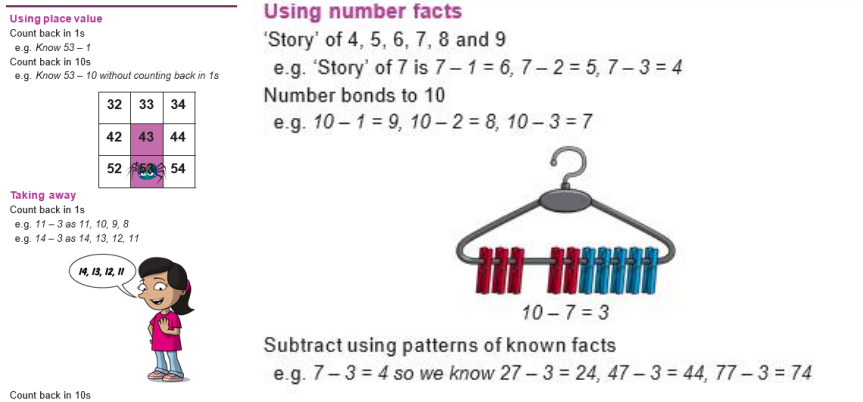
CALCULATION OVERVIEW - KEY STAGE 1		
Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, children will develop an understanding of how numbers work, so that they are confident with 2-digit numbers and beginning to read and say numbers above 100.		
Addition and Subtraction: A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Year 2 knowing the pairs of numbers which make all the numbers up to 10 at least. Children will also have experienced and been taught pairs to 20. Children's knowledge of number facts enables them to add several 1-digit numbers, and to add/subtract a 1-digit number to/from a 2-digit number. Another important conceptual tool is the ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of 10 to and from any 2-digit number. The most important application of this knowledge is the ability to add or subtract any pair of 2-digit numbers by counting on or back in 10s and 1s. Children may extend this to adding by partitioning numbers into 10s and 1s.	**Multiplication and Division:** Children will be taught to count in 2s, 3s, 5s and 10s, and will relate this skill to repeated addition. Children will meet and begin to learn the associated ×2, ×3, ×5 and ×10 tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. Children will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division.	**Fractions:** Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Taken from Abacus - https://www.activelearnprimary.co.uk/planning#abacus

Year 1	Mental Calculation	
Addition and subtraction	Objectives	Abacus images

- Represent and use number bonds and related addition and subtraction facts within 20.
- Count to and across 100 forwards and backwards from any given number.
- Add and subtract 1-digit and 2-digit numbers to 20 including 0, understanding that the = sign can be found in a range of places.
- Count, read and write numbers to 100 in numerals.
- Read and write numbers to 20 in words.
- Say 1 more / less to 100.
- Solve 1-step problems that involve + and – using concrete objects and pictorial; representations.
- Solve missing number problems e.g. 7= ? – 9.





Year 1	Mental Calculation	
Multiplication and Division	Objectives	Abacus images

- Count in multiples of 1, 2, 5 and 10. Count backwards in multiples of 1 and 10.
- Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, using pictorial representation, objects and arrays.
- Solve 1-step multiplication and division problems.
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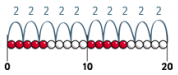
Counting in steps ('clever' counting)

Count in 2s



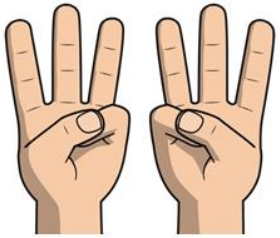
Count in 10s

1	2	3	4	5	6	7	8	9	10s
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Doubling and halving

Find doubles to double 5 using fingers

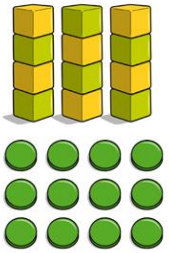
e.g. *double 3*



Grouping

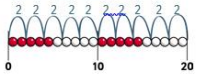
Begin to use visual and concrete arrays and sets of objects to find the answers to 'three lots of four' or 'two lots of five'

e.g. *three lots of four*



Counting in steps ('clever' counting)

Count in 2s



Count in 10s

1	2	3	4	5	6	7	8	9	10s
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Doubling and halving

Find half of even numbers up to 12, including realising that it is hard to halve an odd number

Grouping

Begin to use visual and concrete arrays and 'sets of' objects to find the answers to questions such as *'How many towers of three can I make with twelve cubes?'*

Sharing

Begin to find half of a quantity using sharing

e.g. *find half of 16 cubes by giving one each repeatedly to two children*

Year 2	Mental Calculation	
Addition and subtraction	Objectives	Abacus images

- Recall and use addition and subtraction facts to 20 and derive and use related facts up to 100.
- Add: TU + U, TU + multiples of 10, TU + TU, U+U+U.
- Subtract: TU - U, TU - multiples of 10, TU – TU.
- Read and write numbers to 100 in numerals and words.
- Say 10 more / less to 100.
- Understand and use the commutative law for +.
- Solve problems that involve + and – using concrete objects and pictorial representations including those involving quantities and measures.
- Solve missing number problems using inverse operations for checking.

Using place value

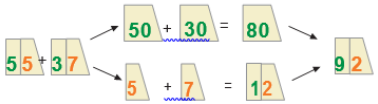
Know 1 more or 10 more than any number

e.g. *1 more than 67*

e.g. *10 more than 85*

Partitioning

e.g. *55 + 37 as 50 + 30 and 5 + 7, then finally combine the two totals: 80 + 12*



Counting on

Add 10 and multiples of 10 to a given 1- or 2-digit number

e.g. *76 + 20 as 76, 86, 96 or in one hop: 76 + 20 = 96*

Add two 2-digit numbers by counting on in 10s, then in 1s

e.g. *55 + 37 as 55 + 30 (85) + 7 = 92*

Add near multiples of 10

e.g. *46 + 19*

e.g. *63 + 21*

Using place value

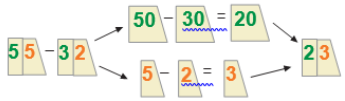
Know 1 less or 10 less than any number

e.g. *1 less than 74*

e.g. *10 less than 82*

Partitioning

e.g. *55 – 32 as 50 – 30 and 5 – 2 and combine the answers: 20 + 3*



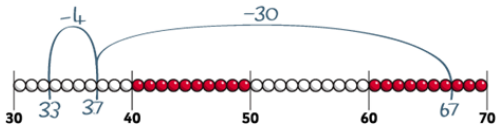
Taking away

Subtract 10 and multiples of 10

e.g. *76 – 20 as 76, 66, 56 or in one hop: 76 – 20 = 56*

Subtract two 2-digit numbers by counting back in 10s, then in 1s

e.g. *67 – 34 as 67 subtract 30 (37) then count back 4 (33)*



Subtract near multiples of 10

e.g. *74 – 21*

e.g. *57 – 19*

Using number facts

Know pairs of numbers which make the numbers up to and including 12

e.g. *8 = 4 + 4, 3 + 5, 2 + 6, 1 + 7, 0 + 8*

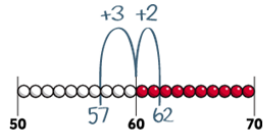
e.g. *10 = 5 + 5, 4 + 6, 3 + 7, 2 + 8, 1 + 9, 0 + 10*

Use patterns based on known facts when adding

e.g. *6 + 3 = 9, so we know 36 + 3 = 39, 66 + 3 = 69, 56 + 3 = 59*

Bridging 10

e.g. *57 + 5 = 57 + 3 (60) + 2 = 62*



Add three or more 1-digit numbers, spotting bonds to 10 or doubles

e.g. *3 + 5 + 3 = 6 + 5 = 11*

e.g. *8 + 2 + 4 = 10 + 4 = 14*

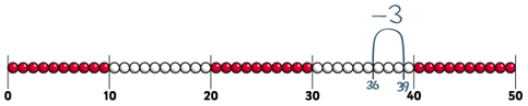
Using number facts

Know pairs of numbers which make the numbers up to and including 12 and derive related subtraction facts

e.g. *10 – 6 = 4, 8 – 3 = 5, 5 – 2 = 3*

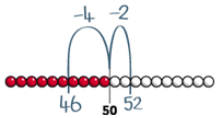
Subtract using patterns of known facts

e.g. *9 – 3 = 6, so we know 39 – 3 = 36, 69 – 3 = 66, 89 – 3 = 86*



Bridging 10

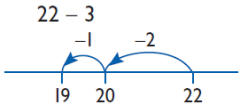
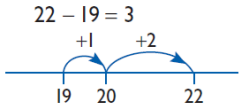
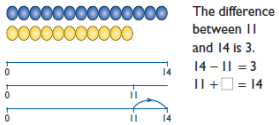
e.g. *52 – 6 as 52 – 2 (50) – 4 = 46*



Counting up

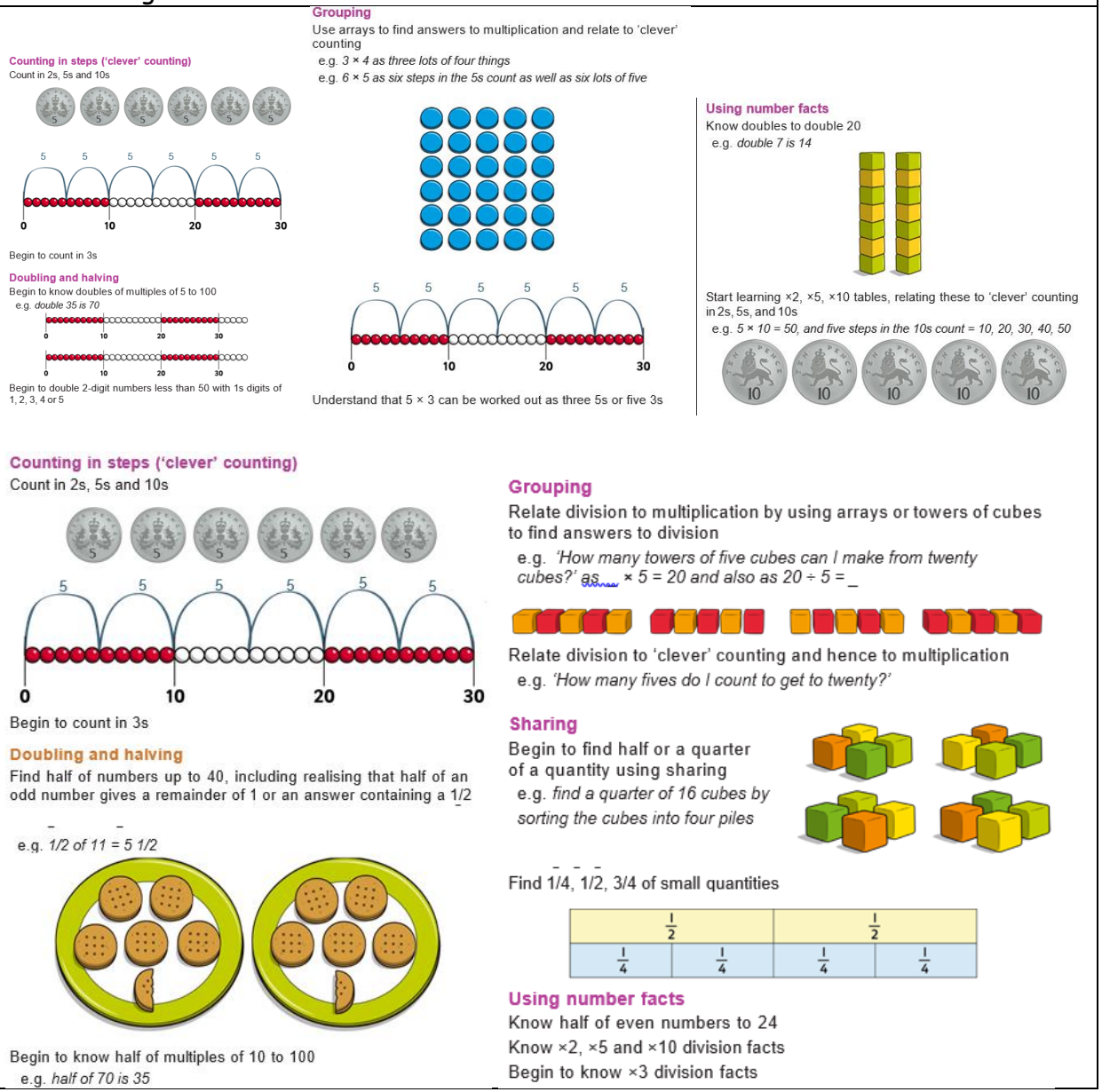
Find a difference between two numbers on a line where the numbers are close together

e.g. *51 – 47*

Year 2	Written Calculation	
Addition and subtraction	Objectives	Abacus images
	• Use informal jottings as an introduction to the use of written methods e.g. partitioning and recombining. 62 + 35 = 60 +30 + 2 +5= 90 + 7 **62 + 35** = … 60 + 30 = 90 2 + 5 = 7 **62 + 35 = 97** • Use pictorial representation (empty number line) for TU + TU and TU – TU.   	*No images for written addition/subtraction - see mental images/jottings*

Year 2	Mental Calculation	
Multiplication and Division	Objectives	Abacus images

- Count in multiples of 2, 3 and 5 from 0 up to 100.
- Count forwards and backwards in multiples of 10 from any number.
- Recall and use x and ÷ facts for 2, 5 and 10 times tables.
- Understand and use the commutative law for x.
- Calculate multiplication and division statements within the multiplication tables and write them using x ÷ = and use inverse for checking.
- Solve multiplication and division problems using repeated addition, materials, arrays and mental strategies.



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.

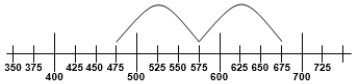
Taken from Abacus - https://www.activelearnprimary.co.uk/planning#abacus

Year 3	Mental Calculation	
Addition and subtraction Vocabulary: column addition numerator denominator unit fraction	Objectives • Add: HTU + U, HTU + multiples of 10, HTU + multiple of 100 • Subtract: HTU - U, HTU - multiples of 10, HTU - multiple of 100. • Read and write numbers to 1000 in numerals and words. • Find 100 more / less than a given number. • Solve problems that involve more complex + and –. • Solve more complex missing number problems using inverse operations for checking.	Abacus images

Using place value

Count in 100s

e.g. Know 475 + 200 as 475, 575, 675

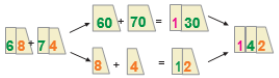


Add multiples of 10, 100 and £1

e.g. 746 + 200
e.g. 746 + 40
e.g. £6·34 + £5 as £6 + £5 and 34p

Partitioning

e.g. £8·50 + £3·70 as £8 + £3 and 50p + 70p and combine the totals: £11 + £1·20
e.g. 347 + 36 as 300 and 40 + 30 and 7 + 6 and combine the totals: 370 + 13 = 383
e.g. 68 + 74 as 60 + 70 and 8 + 4 and combine the totals: 130 + 12 = 142



Taking away

Use place value to subtract

e.g. 348 – 300
e.g. 348 – 40
e.g. 348 – 8

Take away multiples of 10, 100 and £1

e.g. 476 – 40 = 436
e.g. 476 – 300 = 176
e.g. £4·76 – £2 = £2·76

Partitioning

e.g. 68 – 42 as 60 – 40 and 8 – 2
e.g. £6·84 – £2·40 as £6 – £2 and 80p – 40p

Using number facts

Know pairs which total each number to 20

e.g. 20 – 14 = 6

Number bonds to 100

e.g. 100 – 48 = 52
e.g. 100 – 35 = 65

Subtract using number facts to bridge back through a 10

e.g. 42 – 5 = 42 – 2 (40) – 3 = 37

Counting on

Add two 2-digit numbers by adding the multiple of 10, then the 1s

e.g. 67 + 55 as 67 + 50 (117) + 5 = 122

Add near multiples of 10 and 100

e.g. 67 + 39
e.g. 364 + 199

Add pairs of 'friendly' 3-digit numbers

e.g. 548 + 120

Count on from 3-digit numbers

e.g. 247 + 34 as 247 + 30 (277) + 4 = 281

Using number facts

Know pairs which total each number to 20

e.g. 7 + 8 = 15
e.g. 12 + 6 = 18

Number bonds to 100

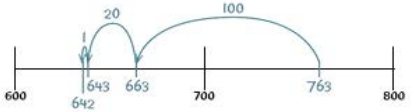
e.g. 35 + 65
e.g. 46 + 54
e.g. 73 + 27

Add to the next 10 and the next 100

e.g. 176 + 4 = 180
e.g. 435 + 65 = 500

Count back in 100s, 10s then 1s

e.g. 763 – 121 as 763 – 100 (663) – 20 (643) – 1 = 642



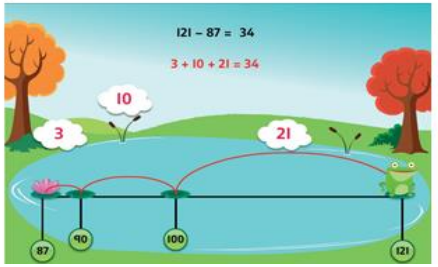
Subtract near multiples of 10 and 100

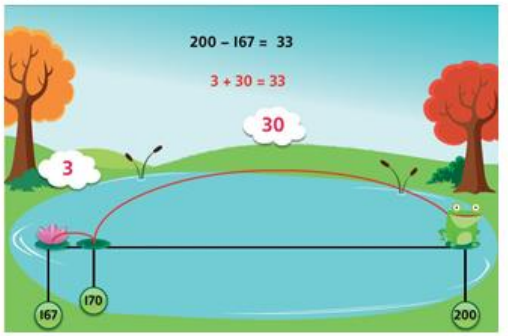
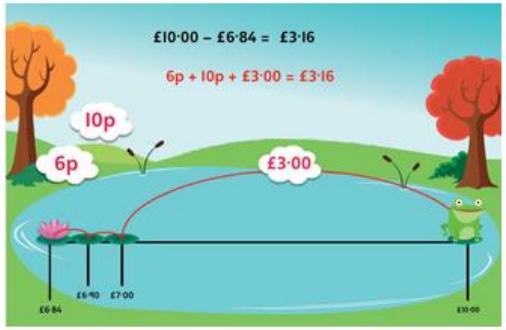
e.g. 648 – 199
e.g. 86 – 39

Counting up

Find a difference between two numbers by counting up from the smaller to the larger

e.g. 121 – 87



Year 3	Written Calculation	
Addition and subtraction **<u>Written calculations on 1cm squared paper.</u>** Vocabulary: column addition numerator denominator unit fraction	Objectives • Formal column method for: HTU + HTU; HTU – HTU 789 + 642 becomes 7 8 9 + 6 4 2 1 4 3 1 1 1 Answer: 1431 • Estimate answers and use inverse to check. Begin to add and subtract like fractions within a whole. (E.g. $^{3}/_{8}$ + $^{1}/_{8}$ + $^{1}/_{8}$)	Abacus images Build on partitioning to develop expanded column addition with two 3-digit numbers e.g. *466 + 358* 400 60 6 + 300 50 8 700 110 14 = 824 Use expanded column addition where digits in a column add to more than the column value e.g. *466 + 358* 400 60 6 300 50 8 + 100 10 800 20 4 Compact column addition with two or more 3-digit numbers or towers of 2-digit numbers e.g. *347 + 286 + 495* 347 286 + 495 21 1128 Compact column addition with 3- and 4-digit numbers Recognise like fractions that add to 1 e.g. *1/4 + 3/4* e.g. *3/5 + 2/5* Develop counting up subtraction e.g. *200 – 167*  Use counting up subtraction to find change from £1, £5 and £10 e.g. *£10·00 – £6·84*  Recognise complements of any fraction to 1 e.g. *1 – 1/4 = 3/4* e.g. *1 – 3/5 = 2/5*

789 + 642 becomes

7 8 9
+ 6 4 2
1 4 3 1
1 1

Answer: 1431

874 – 523 becomes

8 7 4
– 5 2 3
3 5 1

Answer: 351

932 – 457 becomes

8 12 1
9 3 2
– 4 5 7
4 7 5

Answer: 475

932 – 457 becomes

1 1
9 3 2
– 4 5 7
5 6
4 7 5

Answer: 475

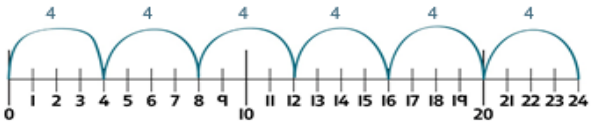
Year 3	Mental Calculation	
Multiplication and Division Vocabulary: grid method integer scaling correspondence	Objectives	Abacus images

- Count in multiples of 4, 8, 50 and 100 from 0.
- Recall and use x and ÷ facts for 3, 4 and 8 times tables.
- U x multiples of 10 for known tables facts e.g use 4 x 8 to find 4 x 80 or 8 x 400.
- Continue to solve increasingly complex missing number problems.
- Solve positive integer scaling problems and correspondence problems in which *n* objects are connected to *m* objects.

Counting in steps ('clever' counting)

Count in 2s, 3s, 4s, 5s, 8s and 10s

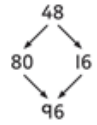
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Doubling and halving

Find doubles of numbers to 50 using partitioning

e.g. *double 48*



Use doubling as a strategy in multiplying by 2

e.g. *18 × 2 is double 18 = 36*

Grouping

Recognise that multiplication is commutative

e.g. *4 × 8 = 8 × 4*

Multiply multiples of 10 by 1-digit numbers

e.g. *30 × 8 = 240*

Multiply 'friendly' 2-digit numbers by 1-digit numbers

e.g. *13 × 4*

Using number facts

Know doubles to double 20

e.g. *double 15 is 30*

Know doubles of multiples of 5 to 100

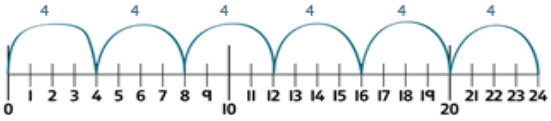
e.g. *double 85 is 170*

Know ×2, ×3, ×4, ×5, ×8, ×10 tables facts

Counting in steps ('clever' counting)

Count in 2s, 3s, 4s, 5s, 8s and 10s

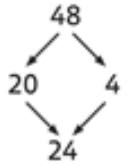
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Doubling and halving

Find half of even numbers to 100 using partitioning

e.g. *find half of 48*



Use halving as a strategy in dividing by 2

e.g. *36 ÷ 2 is half of 36 = 18*

Find half of odd numbers

Year 3	Written Calculation	
Multiplication and Division **<u>Written calculations on 1cm squared paper.</u>** Vocabulary: grid method integer scaling correspondence	Objectives • Use partitioning (grid multiplication) to multiply TU x U for known tables facts e.g. 37 x 4.	Abacus images

×	30	5
7	210	35

210 + 35 = 245

Build on partitioning to develop grid multiplication

e.g. *23 × 4*

×	20	3	
4	80	12	= 92

Perform divisions just above the 10th multiple using written jottings, understanding how to give a remainder as a whole number

Use division facts to find unit and simple non-unit fractions of amounts within the times-tables

- e.g. *3/4 of 48 is 3 × (48 ÷ 4) = 36*

Year 4	Mental Calculation	
Addition and subtraction Vocabulary improper fraction	Objectives	Abacus images

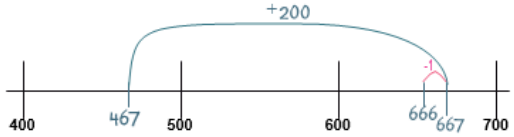
- Find 1000 more / less than a given number.
- Count backwards through 0 to include negative numbers.
- Solve more complex number problems (using inverse operations for checking) for larger positive numbers.

Using place value

Count in 1000s
e.g. *Know 3475 + 2000 as 3475, 4475, 5475*
Partitioning
e.g. *746 + 40*
e.g. *746 + 203 as 700 + 200 and 40 and 6 + 3*
e.g. *134 + 707 as 100 + 700 and 30 and 4 + 7*

Counting on

Add 2-digit numbers to 2-, 3- and 4-digit numbers by adding the multiple of 10 then the 1s
e.g. *167 + 55 as 167 + 50 (217) + 5 = 222*
Add near multiples of 10, 100 and 1000
e.g. *467 + 199*
e.g. *3462 + 2999*

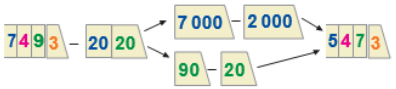


Count on to add 3-digit numbers and money
e.g. *463 + 124 as 463 + 100 (563) + 20 (583) + 4 = 587*
e.g. *£4·67 + £5·30 as £9·67 + 30p*

Taking away

Use place value to subtract
e.g. *4748 – 4000*

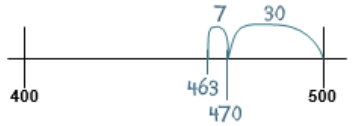
Take away multiples of 10, 100, 1000, £1, 10p or 0·1
e.g. *8392 – 50*
e.g. *6723 – 3000*
e.g. *£3·74 – 30p*
e.g. *5·6 – 0·2*
Partitioning
e.g. *£5·87 – £3·04 as £5 – £3 and 7p – 4p*
e.g. *7493 – 2020 as 7000 – 2000 and 90 – 20*



Count back
e.g. *6482 – 1301 as 6482 – 1000 (5482) – 300 (5182) – 1 = 5181*
Subtract near multiples of 10, 100, 1000 or £1
e.g. *3522 – 1999*
e.g. *£34·86 – £19·99*

Using number facts

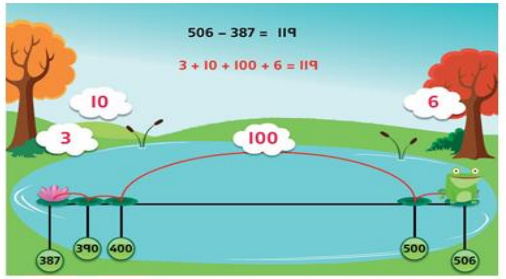
Number bonds to 100 and to the next multiple of 100
e.g. *288 + 12 = 300*
e.g. *1353 + 47 = 1400*
e.g. *463 + 37 = 500*



Number bonds to £1 and to the next whole pound
e.g. *63p + 37p = £1*
e.g. *£3·45 + 55p = £4*
Add to the next whole number
e.g. *4·6 + 0·4*
e.g. *7·2 + 0·8*

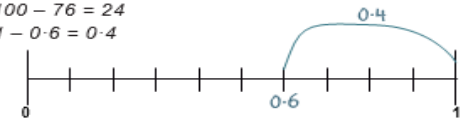
Counting up

Find a difference between two numbers by counting up from the smaller to the larger
e.g. *506 – 387*
e.g. *4000 – 2693*



Using number facts

Number bonds to 10 and 100 and derived facts
e.g. *100 – 76 = 24*
e.g. *1 – 0·6 = 0·4*



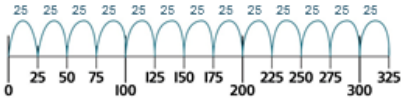
Number bonds to £1 and £10
e.g. *£1·00 – 86p = 14p*
e.g. *£10·00 – £3·40 = £6·60*

Year 4	Written Calculation	
Addition and subtraction **<u>Written calculations on 5mm squared paper</u>** Vocabulary improper fraction	Objectives • Column addition / subtraction for 4-digit numbers and numbers with up to 1 decimal place. • Solve 2-step real life problems using appropriate methods. • Estimate answers and use inverse to check. Begin to add and subtract like fractions which may total more than a whole. (E.g. $^{3}/_{8}$ + $^{6}/_{8}$)	Abacus images Build on expanded column addition to develop compact column addition with larger numbers e.g. *1466 + 4868* 1000 400 60 6 4000 800 60 8 + 1000 100 10 6000 300 30 4 Compact column addition with larger numbers e.g. *5347 + 2286 + 1495* 5347 2286 + 1495 121 9128 Use expanded and compact column addition to add amounts of money Add like fractions – – – e.g. *3/8 + 1/8 + 1/8* Expanded column subtraction with 3- and 4-digit numbers e.g. *726 – 358* 600 110 16 ~~700~~ ~~20~~ ~~6~~ – 300 50 8 300 60 8 Begin to develop compact column subtraction e.g. *726 – 358* 6 11 16 ~~7~~ ~~2~~ ~~6~~ – 3 5 8 3 6 8 Use counting up subtraction to find change from £10, £20, £50 ar £100 e.g. *Buy a computer game for £34·75 using £50* 5p 20p £5 £10 £34·75 £34·80 £35 £40 £50 Subtract like fractions – – – e.g. *3/8 – 1/8 = 2/8*

Year 4	Mental Calculation	
Multiplication and Division Vocabulary chunking short division	Objectives • Count in multiples of 6, 7, 9, 25 and 1000. • Recall and use x and ÷ facts for all times tables up to 12x12. • Use knowledge of x facts to multiply 3 single-digit numbers in the most appropriate order. (e.g. 7 x 8 x 2 NOT 2 x 8 x 7)	Abacus images

Counting in steps (sequences)

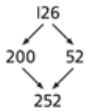
Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



Doubling and halving

Find doubles to double 100 and beyond using partitioning

e.g. *double 126*



Begin to double amounts of money

e.g. *£3·50 doubled is £7*

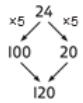
Use doubling as a strategy in multiplying by 2, 4 and 8

e.g. *34 × 4 is double 34 (68) doubled again = 136*

Grouping

Use partitioning to multiply 2-digit numbers by 1-digit numbers

e.g. *24 × 5*



Multiply multiples of 100 and 1000 by 1-digit numbers using tables facts

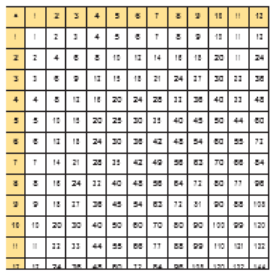
e.g. *400 × 8 = 3200*

Multiply near multiples by rounding e.g.

24 × 19 as (24 × 20) – 24 = 456

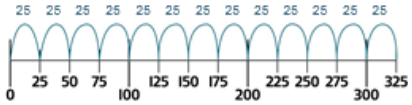
Using number facts

Know times-tables up to 12 × 12



Counting in steps (sequences)

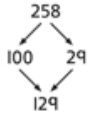
Count in 2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s, 25s, 50s, 100s and 1000s



Doubling and halving

Find half of even numbers to 200 and beyond using partitioning

e.g. *find half of 258*



Begin to halve amounts of money

e.g. *£9 halved is £4·50*

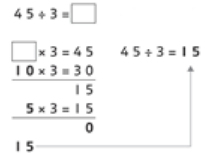
Use halving as a strategy in dividing by 2, 4 and 8

e.g. *164 ÷ 4 is half of 164 (82) halved again = 41*

Grouping

Use multiples of 10 times the divisor to divide by 1-digit numbers above the tables facts

e.g. *45 ÷ 3 as 10 × 3 (30) and 5 × 3 (15)*

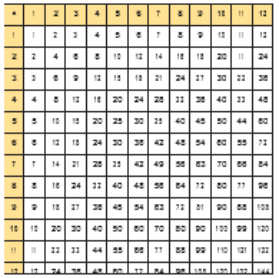


Divide multiples of 100 by 1-digit numbers using division facts

e.g. *3200 ÷ 8 = 400*

Using number facts

Know times-tables up to 12 × 12 and all related division facts



Year 4	Written Calculation	
Multiplication and Division **<u>Written calculations on 5mm squared paper</u>** Vocabulary chunking short division	Objectives • Use formal column x for: TU x U; HTU x U. • Use informal written methods for division (chunking) progressing to formal methods for: TU ÷ U; HTU ÷ U.	Abacus images

24 × 6 becomes

	2	4
×		6
1	4	4
	2	

Answer: 144

342 × 7 becomes

	3	4	2
×			7
2	3	9	4
	2	1	

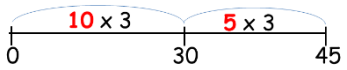
Answer: 2394

2741 × 6 becomes

	2	7	4	1
×				6
1	6	4	4	6
	4	2		

Answer: 16 446

45 ÷ 3 = ?



24 × 6 becomes

	2	4
×		6
1	4	4
	2	

Answer: 144

342 × 7 becomes

	3	4	2
×			7
2	3	9	4
	2	1	

Answer: 2394

2741 × 6 becomes

	2	7	4	1
×				6
1	6	4	4	6
	4	2		

Answer: 16 446

Use grid multiplication to multiply 3-digit numbers by 1-digit numbers

e.g. *253 × 6*

×	200	50	3	
6	1200	300	18	= 1518

Use a vertical written algorithm (ladder) to multiply 3-digit numbers by 1-digit numbers

e.g. *253 × 6*

2 5 3
× 6
1 2 0 0 ← 6 × 200
3 0 0 ← 6 × 50
+ 1 8 ← 6 × 3
1 5 1 8

Use grid multiplication to multiply 2-digit numbers by 2-digit numbers

e.g. *16 × 48*

×	10	6	
40	400	240	= 640
8	80	48	= 128
			768

Use a written version of a mental method to divide 2- and 3-digit numbers by 1-digit numbers

e.g. *86 ÷ 3 as 20 × 3 (60) and 8 × 3 (24), remainder 2*

86 ÷ 3 = □

□ × 3 = 86
20 × 3 = 60
26
8 × 3 = 24
2
28

86 ÷ 3 = 28 r2

Use division facts to find unit and non-unit fractions of amounts within the times-tables

- e.g. *7/8 of 56 is 7 × (56 ÷ 8) = 48*

CALCULATION OVERVIEW - 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.

Taken from Abacus - https://www.activelearnprimary.co.uk/planning#abacus

Year 5	Mental Calculation	
Addition and subtraction Vocabulary powers rounding multi-step	Objectives • Count forwards and backwards with positive and negative numbers through zero. • Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000. • Add and subtract numbers mentally with increasingly large numbers (e.g. 3 / 4-digit numbers). Use rounding to check that answers to written calculations are reasonable	Abacus images

Using place value

Count in 0·1s, 0·01s

e.g. *Know what 0·1 more than 0·51 is*

10s	1s	0·1s	0·01s
	0	5	1

Partitioning

e.g. *2·4 + 5·8 as 2 + 5 and 0·4 + 0·8 and combine the totals: 7 + 1·2 = 8·2*

0·1	0·2	0·3	0·4	0·5	0·6	0·7	0·8	0·9	1
1·1	1·2	1·3	1·4	1·5	1·6	1·7	1·8	1·9	2
2·1	2·2	2·3	2·4	2·5	2·6	2·7	2·8	2·9	3
3·1	3·2	3·3	3·4	3·5	3·6	3·7	3·8	3·9	4
4·1	4·2	4·3	4·4	4·5	4·6	4·7	4·8	4·9	5
5·1	5·2	5·3	5·4	5·5	5·6	5·7	5·8	5·9	6
6·1	6·2	6·3	6·4	6·5	6·6	6·7	6·8	6·9	7
7·1	7·2	7·3	7·4	7·5	7·6	7·7	7·8	7·9	8
8·1	8·2	8·3	8·4	8·5	8·6	8·7	8·8	8·9	9
9·1	9·2	9·3	9·4	9·5	9·6	9·7	9·8	9·9	10

Counting on

Add two decimal numbers by adding the 1s, then the 0·1s/0·01s

e.g. *5·72 + 3·05 as 5·72 + 3 (8·72) + 0·05 = 8·77*

Add near multiples of 1

e.g. *6·34 + 0·99*

e.g. *5·63 + 0·9*

Count on from large numbers

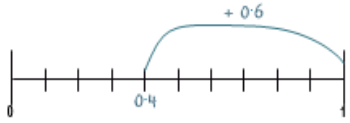
e.g. *6834 + 3005 as 9834 + 5*

Using number facts

Number bonds to 1 and to the next whole number

e.g. *5·7 + 0·3*

e.g. *0·4 + 0·6*



Add to the next 10 from a decimal number

e.g. *7·8 + 2·2 = 10*

Taking away

Use place value to subtract decimals

e.g. *4·58 – 0·08*

e.g. *6·26 – 0·2*

Take away multiples of powers of 10

e.g. *15 672 – 300*

e.g. *4·82 – 2* e.g. *2·71 – 0·5*

e.g. *4·68 – 0·02*

Partitioning or counting back

e.g. *3964 – 1051*

e.g. *5·72 – 2·01*

Subtract near multiples of 1, 10, 100, 1000, 10 000 or £1

e.g. *86 456 – 9999*

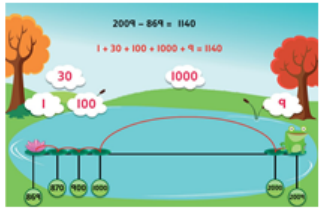
e.g. *3·58 – 1·99*

Counting up

Find a difference between two numbers by counting up from the smaller to the larger

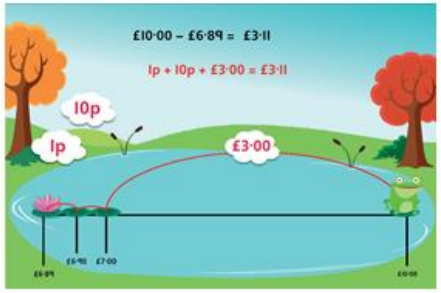
e.g. *£12·05 – £9·59*

e.g. *2009 – 869*



Find change using shopkeepers' addition

e.g. *Buy a toy for £6·89 using £10·00*



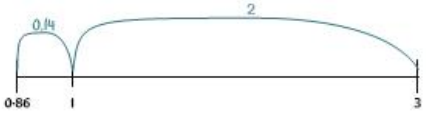
Find a difference between two amounts of money by counting up

Using number facts

Derived facts from number bonds to 10 and 100

e.g. *2 – 0·45 using 45 + 55 = 100*

e.g. *3 – 0·86 using 86 + 14 = 100*



Number bonds to £1, £10 and £100

e.g. *£4·00 – £3·86*

e.g. *£100 – £66 using 66 + 34 = 100*

Year 5	Written Calculation	
Addition and subtraction **<u>Written calculations on 5mm squared paper</u>** Vocabulary powers rounding multi-step	Objectives • Column addition / subtraction for > 4-digit numbers and numbers with up to 2 decimal places. • Solve multi-step real life problems using appropriate methods.	Abacus images

Expanded column addition for money leading to compact column addition for adding several amounts of money

e.g. *£14·64 + £28·78 + £12·26*

	£14	60p	4p
	£28	70p	8p
+	£12	20p	6p
	£1	10p	
	£55	60p	8p

Compact column addition to add pairs of 5-digit numbers

Continue to use column addition to add towers of several larger numbers

Use compact addition to add decimal numbers with up to 2 decimal places

e.g. *15·68 + 27·86*

	15·68
+	27·86
	11·1
	43·54

Add related fractions

e.g. *3/4 + 1/8 = 7/8*

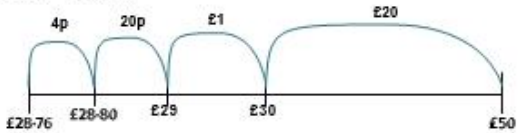
Compact column subtraction for numbers with up to 5 digits

e.g. *16 324 – 8516*

	0	15	13	1	14
	~~1~~	~~6~~	~~3~~	~~2~~	~~4~~
–		8	5	1	6
		7	8	0	8

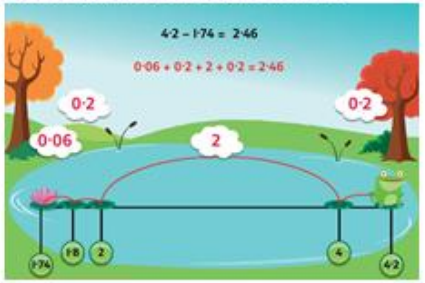
Continue to use counting up subtraction for subtractions involving money, including finding change

e.g. *£50 – £28·76*



Use counting up subtraction to subtract decimal numbers

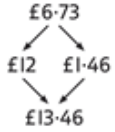
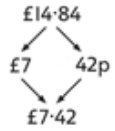
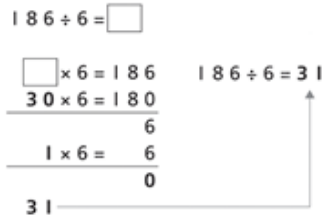
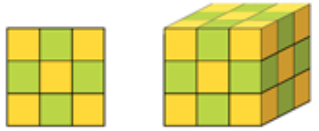
e.g. *4·2 – 1·74*



Subtract related fractions

e.g. *3/4 – 1/8 = 5/8*

NB Counting up subtraction provides a default method for ALL children

Year 5	Mental Calculation	
Multiplication and Division Vocabulary prime numbers prime factors composite numbers (non-prime numbers) square numbers cube numbers proper fraction mixed number remainder	Objectives • Identify all multiples and factor, including finding all factor pairs and common factors of two numbers. • Recall prime numbers up to 19 and calculate prime numbers up to 100 and use associated vocabulary. • U x multiples of 10 / 100 for all tables facts e.g use 12 x 3 to find 12 x 30 or 12 x 300. • Use known facts to divide numbers mentally e.g. 560 ÷ 7 = 80. • Multiply and divide whole numbers and decimals by 10, 100 and 1000. • Recognise, use and solve problems involving square numbers and cube numbers and the notation used e.g ^{2} and ^{3}.	Abacus images **Doubling and halving** Double amounts of money using partitioning e.g. *double £6·73*  Use doubling and halving as a strategy in multiplying by 2, 4, 8, 5 and 20 e.g. *58 × 5 is half of 58 × 10 (580) = 290* **Grouping** Multiply whole numbers and decimals by 10, 100, 1000 e.g. *3·4 × 100 = 340* Use partitioning to multiply 'friendly' 2- and 3-digit numbers by 1-digit numbers e.g. *402 × 6 as 400 × 6 (2400) and 2 × 6 (12) = 2412* Use partitioning to multiply decimal numbers by 1-digit numbers e.g. *4·5 × 3 as 4 × 3 (12) and 0·5 × 3 (1·5) = 13·5* Multiply near multiples by rounding e.g. *32 × 29 as (32 × 30) – 32 = 928* **Using number facts** Use times-tables facts up to 12 × 12 to multiply multiples of 10/100 of the multiplier e.g. *4 × 6 = 24 so 40 × 6 = 240 and 400 × 6 = 2400* Use knowledge of factors and multiples in multiplication e.g. *43 × 6 is double 43 × 3* e.g. *28 × 50 is half of 28 × 100 (2800) = 1400* Know square numbers and cube numbers **Doubling and halving** Halve amounts of money using partitioning e.g. *half of £14·84 is half of £14 (£7) plus half of 84p (42p)*  Use doubling and halving as a strategy in dividing by 2, 4, 8, 5 and 20 e.g. *115 ÷ 5 as double 115 (230) ÷ 10 = 23* **Grouping** Divide numbers by 10, 100, 1000 to obtain decimal answers with up to 3 decimal places e.g. *340 ÷ 100 = 3·4* Use the 10th, 20th, 30th … multiple of the divisor to divide 'friendly' 2- and 3-digit numbers by 1-digit numbers e.g. *186 ÷ 6 as 30 × 6 (180) and 1 × 6 (6)*  **Using number facts** Use division facts from the times-tables up to 12 × 12 to divide multiples of powers of 10 of the divisor e.g. *3600 ÷ 9 using 36 ÷ 9* Know square numbers and cube numbers 

Year 5	Written Calculation	
Multiplication and Division	Objectives	Abacus images

Written calculations on 5mm squared paper

Vocabulary
prime numbers
prime factors
composite numbers (non-prime numbers)
square numbers
cube numbers
proper fraction
mixed number
remainder

- Use formal column x for: ThHTU x U; ThHTU x TU.
- Use formal written methods for division, interpreting the remainder appropriately for: ThHTU ÷ U.
- Multiply proper fractions and mixed numbers by whole numbers supported by materials and diagrams.

Short multiplication of 2-, 3- and 4-digit numbers by 1-digit numbers
e.g. *435 × 8*

```
  4 3 5
×     8
  2 4
3 4 8 0
```

Long multiplication of 2-, 3-and 4-digit numbers by 'teen' numbers
e.g. *48 × 16*

```
   4 8
× 1 6
4 8 0
2 8 ⁴8
1
7 6 8
```

Use a written version of a mental strategy to divide 3-digit numbers by 1-digit numbers
e.g. *326 ÷ 6 as 50 × 6 (300) and 4 × 6 (24), remainder 2*

```
3 2 6 ÷ 6 = □

□ × 6 = 3 2 6        3 2 6 ÷ 6 = 5 4 r2
5 0 × 6 = 3 0 0
          2 6
  4 × 6 =   2 4
            2
5 4
```

Grid multiplication of numbers with up to 2 decimal places by 1-digit numbers
e.g. *1·34 × 6*

×	1	0·3	0·04	
6	6	1·8	0·24	= 8·04

Multiply fractions by 1-digit numbers
e.g. *3/4 × 6 = 18/4 = 4 2/4 = 4 1/2*

NB Grid multiplication provides a default method for ALL children

Short division of 3- and 4-digit numbers by 1-digit numbers
e.g. *139 ÷ 3*

```
      4 6 r 1
3 ) 1 3 ¹9
```

Give remainders as whole numbers or as fractions
Find unit and non-unit fractions of large amounts
– e.g. *3/5 of 265 is 3 × (265 ÷ 5) = 159*
Turn improper fractions into mixed numbers and vice versa

Taking away
Use place value to subtract decimals
e.g. *7·782 – 0·08*
e.g. *16·263 – 0·2*
Take away multiples of powers of 10
e.g. *132 956 – 400*
e.g. *686 109 – 40 000*
e.g. *7·823 – 0·5*
Partitioning or counting back
e.g. *3964 – 1051*
e.g. *5·72 – 2·01*
Subtract near multiples of powers of 10
e.g. *360 078 – 99 998*
e.g. *12·831 – 0·99*

24 × 16 becomes

```
    2
    2 4
×   1 6
  2 4 0
  1 4 4
  3 8 4
```

Answer: 384

124 × 26 becomes

```
    1 2
    1 2 4
×     2 6
  2 4 8 0
    7 4 4
  3 2 2 4
  1 1
```

Answer: 3224

124 × 26 becomes

```
    1 2
    1 2 4
×     2 6
    7 4 4
  2 4 8 0
  3 2 2 4
  1 1
```

Answer: 3224

432 ÷ 15 becomes

```
        2 8  r 12
1 5 ) 4 3 2
      3 0 0
      1 3 2
      1 2 0
        1 2
```

Answer: 28 remainder 12

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
```

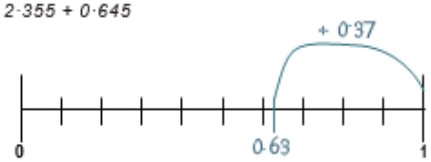
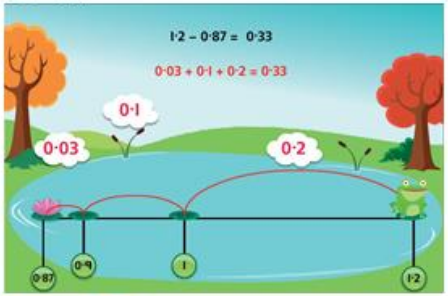
$\frac{12}{15} = \frac{4}{5}$

Answer: $28\frac{4}{5}$

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
```

Answer: 28·8

Year 6	Mental Calculation	
Addition and subtraction Vocabulary common multiples common factors	Objectives	Abacus images
	Add and subtract positive and negative numbers.	**Using place value** Count in 0·1s, 0·01s, 0·001s e.g. *Know what 0·001 more than 6·725 is* Partitioning e.g. *9·54 + 3·23 as 9 + 3, 0·5 + 0·2 and 0·04 + 0·03, to give 12·77* **Counting on** Add two decimal numbers by adding the 1s, then the 0·1s/0·01s/0·001s e.g. *6·314 + 3·006 as 6·314 + 3 (9·314) + 0·006 = 9·32* Add near multiples of 1 e.g. *6·345 + 0·999* e.g. *5·673 + 0·9* Count on from large numbers e.g. *16 375 + 12 003 as 28 375 + 3* **Using number facts** Number bonds to 1 and to the next multiple of 1 e.g. *0·63 + 0·37* e.g. *2·355 + 0·645*  Add to the next 10 e.g. *4·62 + 5·38* **Counting up** Find a difference between two decimal numbers by counting up from the smaller to the larger e.g. *1·2 – 0·87*  **Using number facts** Derived facts from number bonds to 10 and 100 e.g. *0·1 – 0·075 using 75 + 25 = 100* e.g. *5 – 0·65 using 65 + 35 = 100* Number bonds to £1, £10 and £100 e.g. *£7·00 – £4·37* e.g. *£100 – £66·20 using 20p + 80p = £1 and £67 + £33 = £100*

Year 6	Written Calculation	
Addition and subtraction **<u>Written calculations on 5mm squared paper</u>** Vocabulary common multiples common factors	Objectives • Add and subtract fractions with different denominators and mixed numbers. • Solve problems using addition and subtraction, showing awareness of the order in which to perform operations (BIDMAS).	Abacus images

Compact column addition for adding several large numbers and decimal numbers with up to 2 decimal places

Compact column addition with money

e.g. *£14·64 + £28·78 + £12·26*

£14·64
+ £28·78
£12·26
11·1
£55·68

Add unlike fractions, including mixed numbers

e.g. *1/4 + 2/3 = 11/12*

e.g. *2 1/4 + 1 1/3 = 3 7/12*

Compact column subtraction for large numbers

e.g. *34 685 – 16 458*

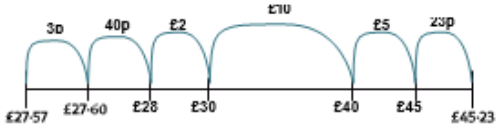
2 14 7 15
~~3~~ ~~4~~ 6 ~~8~~ ~~5~~
– 1 6 4 5 8
1 8 2 2 7

Use counting up for subtractions where the larger number is a multiple or near multiple of 1000 or 10 000

Use counting up subtraction when dealing with money

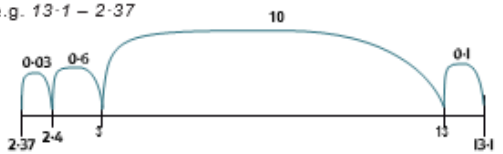
e.g. *£100 – £78·56*

e.g. *£45·23 – £27·57*



Use counting up subtraction to subtract decimal numbers

e.g. *13·1 – 2·37*



Subtract unlike fractions, including mixed numbers

e.g. *3/4 – 1/3 = 5/12*

e.g. *2 3/4 – 1 1/3 = 1 5/12*

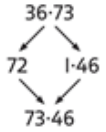
NB Counting up subtraction provides a default method for ALL children

Year 6	Mental Calculation	
Multiplication and Division Vocabulary common multiples common factors	Objectives • Identify common factors, common multiples and prime numbers. • Perform mental calculations with mixed operations and large numbers.	Abacus images

Doubling and halving

Double decimal numbers with up to 2 places using partitioning

e.g. *double 36·73*



Use doubling and halving as strategies in mental multiplication

Grouping

Use partitioning as a strategy in mental multiplication, as appropriate

e.g. *3060 × 4 as 3000 × 4 (12 000) and 60 × 4 (240) = 12 240*

e.g. *8·4 × 8 as 8 × 8 (64) and 0·4 × 8 (3·2) = 67·2*

Use factors in mental multiplication

e.g. *421 × 6 as 421 × 3 (1263) doubled = 2526*

e.g. *3·42 × 5 as half of 3·42 × 10 = 17·1*

Multiply decimal numbers using near multiples by rounding

e.g. *4·3 × 19 as (4·3 × 20) – 4·3 = 81·7*

Using number facts

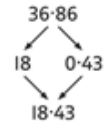
Use times-tables facts up to 12 × 12 in mental multiplication of large numbers or numbers with up to 2 decimal places

e.g. *6 × 4 = 24 and 0·06 × 4 = 0·24*

Doubling and halving

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)*

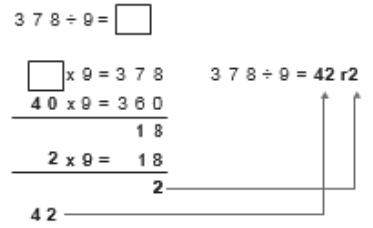


Use doubling and halving as strategies in mental division

Grouping

Use the 10th, 20th, 30th, ... or 100th, 200th, 300th ... multiples of the divisor to divide large numbers

e.g. *378 ÷ 9 as 40 × 9 (360) and 2 × 9 (18), remainder 2*



Use tests for divisibility

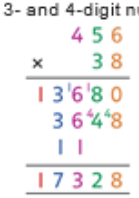
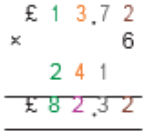
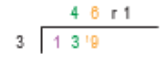
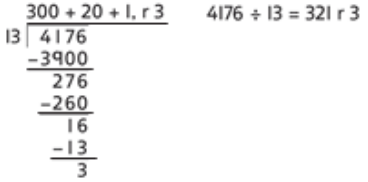
e.g. *135 divides by 3, as 1 + 3 + 5 = 9 and 9 is in the ×3 table*

Using number facts

Use division facts from the times-tables up to 12 × 12 to divide decimal numbers by 1-digit numbers

e.g. *1·17 ÷ 3 is 1/100 of 117 ÷ 3 (39)*

Know tests of divisibility for numbers divisible by 2, 3, 4, 5, 9, 10 and 25

Year 6	Written Calculation	
Multiplication and Division **<u>Written calculations on 5mm squared paper.</u>** Vocabulary common multiples common factors	Objectives • Use formal column x for: ThHTU x TU. • Use formal written methods for division, interpreting the remainder appropriately for: ThHTU ÷ TU. • Multiply simple pairs of proper fractions, writing the answer in the simplest form. • Divide proper fractions by whole numbers. • Calculate % of whole numbers. Solve problems using multiplication and division, showing awareness of the order in which to perform operations (BIDMAS).	Abacus images Short multiplication of 2-, 3- and 4-digit numbers by 1-digit numbers e.g. *3743 × 6* Long multiplication of 2-, 3- and 4-digit numbers by 2-digit numbers  e.g. *456 × 38* Short multiplication of decimal numbers using × 100 and ÷ 100 e.g. *13·72 × 6 as (1372 × 6) ÷ 100 = 82·32* Short multiplication of money e.g. *£13·72 × 6*  Grid multiplication of numbers with up to 2 decimal places by 1-digit numbers e.g. *6·76 × 4* | × | 6 | 0·7 | 0·06 | | 4 | 24 | 2·8 | 0·24 | = 27·04 Multiply simple pairs of proper fractions e.g. 1/2 × 1/4 = 1/8 – – – **NB Grid multiplication provides a default method for ALL children** Short division of 3- and 4-digit numbers by 1-digit numbers e.g. *139 ÷ 3*  Long division of 3- and 4-digit numbers by 2-digit numbers e.g. *4176 ÷ 13*  Give remainders as whole numbers, fractions or decimals Use place value to divide 1- and 2-place decimals by numbers ≤ 12 e.g. *3.65 ÷ 5 as (365 ÷ 5) ÷ 100 = 0·73* Divide proper fractions by whole numbers