Shaftesbury Park Primary School

Calculations Policy
Pencil and paper procedures
Key Stages 1 & 2

Background to policy.

This policy contains the key pencil and paper procedures that will be taught within our school. It has been written to ensure consistency and progression throughout the school and reflects a whole school agreement.

Although the focus of the policy is on pencil and paper procedures it is important to recognise that the ability to calculate mentally lies at the heart of the Numeracy Strategy. The mental methods in the Framework for teaching mathematics will be taught systematically from Reception onwards and pupils will be given regular opportunities to develop the necessary skills. However mental calculation is not at the exclusion of written recording and should be seen as complementary to and not as separate from it. In every written method there is an element of mental processing. Sharing written methods with the teacher encourages children to think about the mental strategies that underpin them and to develop new ideas. Therefore written recording both helps children to clarify their thinking and supports and extends the development of more fluent and sophisticated mental strategies.

During their time at this school children will be encouraged to see mathematics as both a written and spoken language. Teachers will support and guide children through the following important stages:

- Developing the use of pictures and a mixture of words and symbols to represent numerical activities;
- Using standard symbols and conventions;
- Use of jottings to aid a mental strategy;
- Use of pencil and paper procedures;
- Use of a calculator.

This policy concentrates on the introduction of standard symbols, the use of the empty number line as a jotting to aid mental calculation and on the introduction of pencil and paper procedures. It is important that children do not abandon jottings and mental methods once pencil and paper procedures are introduced. Therefore children will always be encouraged to look at a calculation/problem and then decide the best method to choose – pictures, mental calculation with or without jottings, structured recording or a calculator. Our long-term aim is for children to be able to select an efficient method of their choice (whether this be mental, written or in upper Key Stage 2 using a calculator) that is appropriate for a given task. They will do this by always asking themselves:

- ‘Can I do this in my head?
- ‘Can I do this in my head using drawings or jottings?’
- ‘Do I need to use a pencil and paper procedure?

- ‘Do I need a calculator?

Addition		
Year 1	Year 2	Year 3
Must	**Must**	**Must**
I can count and number name 10 objects in lots of different ways. I can say what one more than a number is. I can say how many there are altogether by counting all the objects. I can use the words more, and, add, sum, total, altogether to describe my counting and adding.	I can recognise that addition can be done in any order. I can use the +, – and = signs to record mental calculations in a number sentence I can recognise the use of symbols such as • or △ to stand for an unknown number. I can recognise that more than two numbers can be added together.	I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order. I understand that more than two numbers can be added. I can begin to add three single-digit numbers mentally or three two-digit numbers with the help of apparatus (totals up to 100). I understand that subtraction is the inverse of addition (subtraction reverses addition).
Should	**Should**	**Should**
I can recognise that addition can be done in any order. I can use the +, – and = signs to record mental calculations in a number sentence I can recognise the use of symbols such as • or △ to stand for an unknown number. I can recognise that more than two numbers can be added together.	I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order. I understand that more than two numbers can be added. I can begin to add three single-digit numbers mentally or three two-digit numbers with the help of apparatus (totals up to 100). I understand that subtraction is the inverse of addition (subtraction reverses addition).	I can read and begin to write the related vocabulary I can recognise that addition can be done in any order. I can use the +, – and = signs. I know that more than two numbers can be added; I can add three or four single-digit numbers mentally, I can add three or four two-digit numbers with the help of apparatus or pencil and paper. I understanding that subtraction is the inverse of addition.
Could	**Could**	**Could**
I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order. I understand that more than two numbers can be added. I can begin to add three single-digit numbers mentally or	I can read and begin to write the related vocabulary I can recognise that addition can be done in any order. I can use the +, – and = signs. I know that more than two numbers can be added; I can add three or four single-digit numbers mentally, I can add three or four two-digit numbers with the help of apparatus or pencil and paper. I understanding that subtraction is the inverse of addition	I can count on/back in repeated steps of 1, 10 or 100. I can partition into tens and units, adding the tens first. I can identify near doubles, using known doubles I can add/subtract the nearest multiple of 10, and adjust. I can continue to use the relationship between +/- I can add 3 or 4 small numbers, finding pairs totalling 10, or 9 or 11. I can add three two-digit multiples of 10. I can use known number facts and place value to add or

three two-digit numbers with the help of apparatus (totals up to 100). I understand that subtraction is the inverse of addition		subtract mentally, including any pair of two-digit whole numbers.

Addition

Year 1

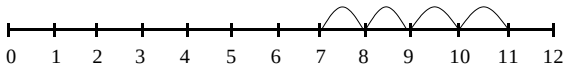
+ = signs and missing numbers

3 + 4 = □ □ = 3 + 4
3 + □ = 7 7 = □ + 4
□ + 4 = 7 7 = 3 + □
□ + ∇ = 7 7 = □ + ∇

Promoting covering up of operations and numbers.

Number lines (numbered)

7 + 4



Recording by - drawing jumps on prepared lines

- constructing own lines

(Teacher model number lines with missing numbers)

(Teachers model jottings appropriate for larger numbers)

Year 2

+ = signs and missing numbers

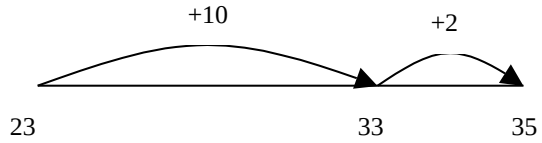
Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
14 + 5 = 10 + □
and adding three numbers
32 + □ + □ = 100 35 = 1 + □ + 5

Partition into tens and ones and recombine

12 + 23 = 10 + 2 + 20 + 3
= 30 + 5
= 35

refine to partitioning the second number only:

23 + 12 = 23 + 10 + 2
= 33 + 2
= 35



Add 9 or 11 by adding 10 and adjusting by 1
35 + 9 = 44

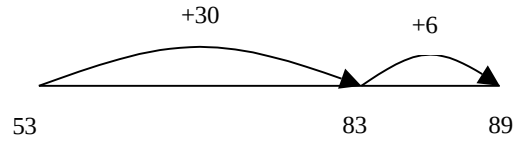
Year 3

+ = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Partition into tens and ones and recombine

Partition both numbers and recombine. Refine to partitioning the second number only e.g.
36 + 53 = 53 + 30 + 6
= 83 + 6
= 89



Add a near multiple of 10 to a two-digit number

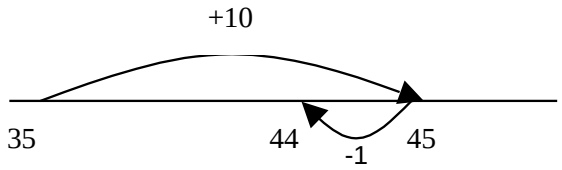
Continue as in Year 2 but with appropriate numbers e.g. 35 + 19 is the same as 35 + 20 – 1.

pencil and paper procedures

83 + 42 = 125

G&T

80 + 3	83	83
+40 + 2	+ 42	+ 42
120 + 5 =125	120	5

		5 **125** 120 **125**

Addition		
Year 4	Year 5	Year 6
Must	**Must**	**Must**
I can read and begin to write the related vocabulary I can recognise that addition can be done in any order. I can use the +, – and = signs. I know that more than two numbers can be added; I can add three or four single-digit numbers mentally, I can add three or four two-digit numbers with the help of apparatus or pencil and paper. I understanding that subtraction is the inverse of addition.	I can count on/back in repeated steps of 1, 10 or 100. I can partition into tens and units, adding the tens first. I can identify near doubles, using known doubles I can add/subtract the nearest multiple of 10, and then adjust. I can continue to use the relationship between +/- I can add 3 or 4 small numbers, finding pairs totalling 10, or 9 or 11. I can add three two-digit multiples of 10. I can use known number facts and place value to add or subtract mentally, including any pair of two-digit whole numbers.	I can partition numbers into H, T and U, adding the most significant digits first. I can identify near doubles, such as 1.5 + 1.6. I can add or subtract the nearest multiple of 10 or 100, then adjust. I can develop further the relationship between addition and subtraction. I can add several numbers (e.g. four or five single digits, or multiples of 10 such as 40 + 50 + 80). I can use known number facts and place value for mental addition and subtraction (e.g. 470 + 380, 7.4 + 9.8).
Should	**Should**	**Should**
I can count on/back in repeated steps of 1, 10 or 100. I can partition into tens and units, adding the tens first. I can identify near doubles, using known doubles I can add/subtract the nearest multiple of 10, and then adjust. I can continue to use the relationship between +/- I can add 3 or 4 small numbers, finding pairs totalling 10, or 9 or 11. I can add three two-digit multiples of 10. I can use known number facts and place value to add or subtract mentally, including any pair of two-digit whole numbers.	I can partition numbers into H, T and U, adding the most significant digits first. I can identify near doubles, such as 1.5 + 1.6. I can add or subtract the nearest multiple of 10 or 100, then adjust. I can develop further the relationship between addition and subtraction. I can add several numbers (e.g. four or five single digits, or multiples of 10 such as 40 + 50 + 80). I can use known number facts and place value for mental addition and subtraction (e.g. 470 + 380, 7.4 + 9.8).	I can add or subtract the nearest multiple of 10, 100 or 1000, then adjust. I can use the relationship between addition and subtraction I can add several numbers. I can use known number facts and place value to consolidate mental addition/subtraction (e.g 470 + 380, 7.4 + 9.8).
Could	**Could**	**Could**
I can partition numbers into H, T and U, adding the most significant digits first. I can identify near doubles, such as 1.5 + 1.6. I can add or subtract the nearest multiple of 10 or 100,	I can add or subtract the nearest multiple of 10, 100 or 1000, then adjust. I can use the relationship between addition and subtraction	I can use informal pencil and paper methods to support, record or explain additions. I can extend my written methods to: column addition of two integers less than 10000;

then adjust. I can develop further the relationship between addition and subtraction. I can add several numbers (e.g. four or five single digits, or multiples of 10 such as 40 + 50 + 80). I can use known number facts and place value for mental addition and subtraction (e.g. 470 + 380, 7.4 + 9.8).	I can add several numbers. I can use known number facts and place value to consolidate mental addition/subtraction (e.g 470 + 380, 7.4 + 9.8).	I can carry out addition of more than two integers less than 10000; I can extend my written methods to column addition of numbers involving decimals. I can carry out addition of a pair of decimal fractions, both with one or both with two decimal places (e.g. £29.78 + £53.34).

Addition

Year 4

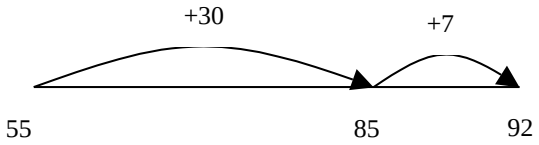
+ = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Partition into tens and ones and recombine

Either partition both numbers and recombine or partition the second number only e.g.

55 + 37 = 55 + 30 + 7
= 85 + 7
= 92



Add the nearest multiple of 10, then adjust

Continue as in Year 2 and 3 but with appropriate numbers e.g. 63 + 29 is the same as 63 + 30 - 1

Pencil and paper procedures

358 + 73 = 431

either **or**

300+50+8 + 70+3 300+120+11 = 431

358 + 73 / 11 / 120 / 300 / 431

Year 5

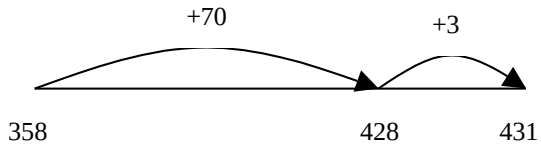
+ = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Partition into hundreds, tens and ones and recombine

Either partition both numbers and recombine or partition the second number only e.g.

358 + 73 = 358 + 70 + 3
= 428 + 3
= 431



Add or subtract the nearest multiple of 10 or 100, then adjust

Continue as in Year 2, 3 and 4 but with appropriate numbers e.g. 458 + 79 = is the same as 458 + 80 - 1

Pencil and paper procedures

Leading to formal method, showing numbers carried underneath for G&T children.

358 + 73 = 431 (11)

Extend to numbers with at least four digits

3587 + 675 = 4262

3587 + 675

Year 6

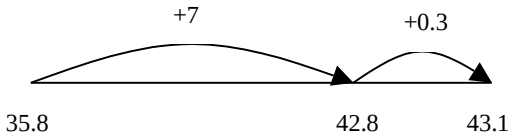
+ = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

Partition into hundreds, tens, ones and decimal fractions and recombine

Either partition both numbers and recombine or partition the second number only e.g.

35.8 + 7.3 = 35.8 + 7 + 0.3
= 42.8 + 0.3
= 43.1



Add the nearest multiple of 10, 100 or 1000, then adjust

Continue as in Year 2, 3, 4 and 5 but with appropriate numbers including extending to adding 0.9, 1.9, 2.9 etc

Pencil and paper procedures

Extend to numbers with any number of digits and decimals with 1 and 2 decimal places.

124.9 + 117.25 = 242.15

124.9 + 117.25

Extend to decimals in the context of money (vertically) £ 2.50 + £ 1.75 = £ 4.25 £ 2.50 + £ 1.75 £ 4.25 1 (Revert to expanded methods if the children experience any difficulty.)	4262 111 Revert to expanded methods if the children experience any difficulty. Extend to decimals (same number of decimals places) and adding several numbers (with different numbers of digits). *Model negative numbers using a number line.*	242.15 11 Revert to expanded methods if the children experience any difficulty. Extend to decimals (either one or two decimal places).
Subtraction		
Year 1	Year 2	Year 3
Must	**Must**	**Must**
	I can use the +, – and = signs to record mental calculations in a number sentence. I can recognise the use of symbols such as • or △ to stand for an unknown number. I can use patterns of similar calculations (e.g. 10 – 0 = 10, 10 – 1 = 9, 10 – 2 = 8…). I can use known number facts and place value to subtract a pair of numbers mentally within the range 0 to at least 10, then 0 to at least 20.	I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions and subtractions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order, but not subtraction: for example, 3 + 21 = 21 + 3, but 21 – 3 does not equal 3 – 21. I understand that subtraction is the inverse of addition (subtraction reverses addition). I can find a small difference by counting up from the smaller to the larger number (e.g. 42 – 39). I can add/subtract 9 or 11: add/subtract 10 and adjust by 1. I can begin to add/subtract 19 or 21: add/subtract 20 and adjust by 1.
Should	**Should**	**Should**
I can use the +, – and = signs to record mental calculations in a number sentence. I can recognise the use of symbols such as • or △ to stand for an unknown number. I can use patterns of similar calculations (e.g. 10 – 0 = 10, 10 – 1 = 9, 10 – 2 = 8…). I can use known number facts and place value to subtract a pair of numbers mentally within the range 0 to at least 10, then 0 to at least 20.	I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions and subtractions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order, but not subtraction: for example, 3 + 21 = 21 + 3, but 21 – 3 does not equal 3 – 21. I understand that subtraction is the inverse of addition (subtraction reverses addition). I can find a small difference by counting up from the smaller to the larger number (e.g. 42 – 39). I can add/subtract 9 or 11: add/subtract 10 and adjust	I can read and begin to write the related vocabulary. I can use the +, – and = signs. I can find a small difference by counting up from the smaller to the larger number (e.g. 102 – 97). I can add and subtract mentally a 'near multiple of 10' to or from a two-digit number… by adding or subtracting 10, 20, 30… and adjusting. I can use patterns of similar calculations. I can say or write a subtraction statement corresponding to a given addition statement, and vice versa. I can use known number facts and place value to add/subtract mentally.

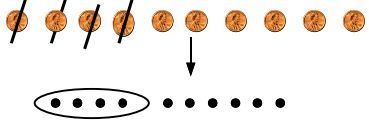
	by 1. I can begin to add/subtract 19 or 21: add/subtract 20 and adjust by 1. I can use patterns of similar calculations. I can say the subtraction corresponding to a given addition, and vice versa. I can use known number facts and place value to add/subtract mentally	
Could	**Could**	**Could**
I can use and begin to read the related vocabulary. I can use the +, – and = signs to record mental additions and subtractions in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I can recognise that addition can be done in any order, but not subtraction: for example, 3 + 21 = 21 + 3, but 21 – 3 does not equal 3 – 21. I understand that subtraction is the inverse of addition (subtraction reverses addition). I can find a small difference by counting up from the smaller to the larger number (e.g. 42 – 39). I can add/subtract 9 or 11: add/subtract 10 and adjust by 1. I can begin to add/subtract 19 or 21: add/subtract 20 and adjust by 1.	I can read and begin to write the related vocabulary. I can use the +, – and = signs. I can find a small difference by counting up from the smaller to the larger number (e.g. 102 – 97). I can add and subtract mentally a 'near multiple of 10' to or from a two-digit number… by adding or subtracting 10, 20, 30… and adjusting. I can use patterns of similar calculations. I can say or write a subtraction statement corresponding to a given addition statement, and vice versa. I can use known number facts and place value to add/subtract mentally.	I can find a small difference by counting up (e.g. 5003 – 4996). I can count on or back in repeated steps of 1,10 or 100. I can add or subtract the nearest multiple of 10, then adjust. I can continue to use the relationship between addition and subtraction. I can use known number facts and place value to add or subtract mentally, including any pair of two-digit whole numbers.

Subtraction

Year 1

Pictures / marks

Sam spent 4p. What was his change from 10p?



- = signs and missing numbers

7 - 3 = □ □ = 7 - 3

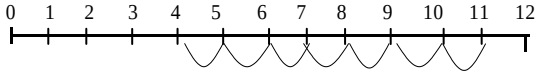
7 - □ = 4 4 = □ - 3

□ - 3 = 4 4 = 7 - □

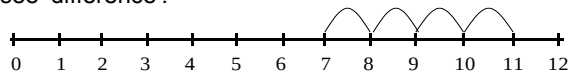
□ - ∇ = 4 4 = □ - ∇

Number lines (numbered)

11 – 7
(Counting back)



The difference between 7 and 11
(Counting up)
To reinforce concept. Practical strategies essential to see 'difference'.



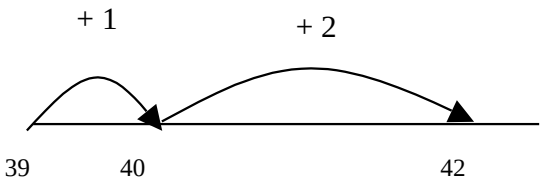
Year 2

- = signs and missing numbers

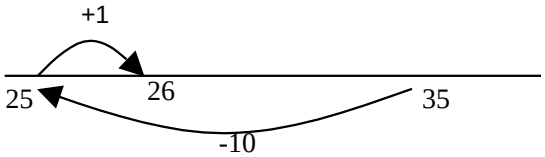
Continue using a range of equations as in Year 1 but with appropriate numbers.
Extend to 14 + 5 = 20 - □

Find a small difference by counting up

42 – 39 = 3



Subtract 9 or 11. Begin to add/subtract 19 or 21
35 – 9 = 26



Use known number facts and place value to subtract
(partition second number only)
37 – 12 = 37 – 10 – 2
= 27 – 2
= 25

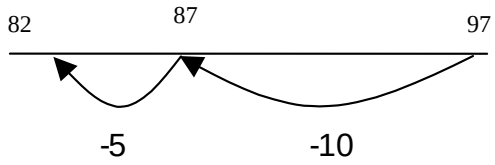
Year 3

- = signs and missing numbers
Continue using a range of equations as in Year and 2 but with appropriate numbers.

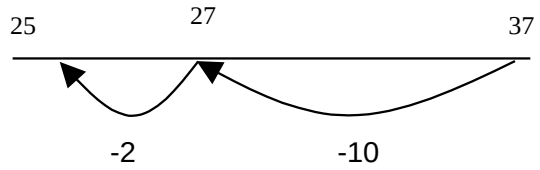
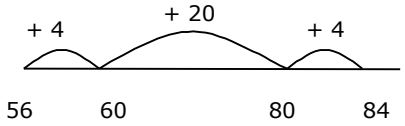
Find a small difference by counting up
Continue as in Year 2 but with appropriate numbers e.g. 102 – 97 = 5

Subtract mentally a 'near multiple of 10' to or from a two-digit number
Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1

Use known number facts and place value to subtract
Continue as in Year 2 but with appropriate numbers e.g.
97 – 15 = 72



Pencil and paper procedures
Complementary addition
84 – 56 = 28

Recording by - drawing jumps on prepared lines - constructing own lines (Teachers model jottings appropriate for larger numbers)		

Subtraction		
Year 4	Year 5	Year 6
Must	**Must**	**Must**
I can read and begin to write the related vocabulary. I can use the +, – and = signs. I can find a small difference by counting up from the smaller to the larger number (e.g. 102 – 97). I can add and subtract mentally a 'near multiple of 10' to or from a two-digit number… by adding or subtracting 10, 20, 30… and adjusting. I can use patterns of similar calculations. I can say or write a subtraction statement corresponding to a given addition statement, and vice versa. I can use known number facts and place value to add/subtract mentally.	I can find a small difference by counting up (e.g. 5003 – 4996). I can count on or back in repeated steps of 1,10 or 100. I can add or subtract the nearest multiple of 10, then adjust. I can continue to use the relationship between addition and subtraction. I can use known number facts and place value to add or subtract mentally, including any pair of two-digit whole numbers.	I can find differences by counting up through next multiple of 10, 100 or 1000, e.g. calculate mentally a difference such as 8006 – 2993. I can add or subtract the nearest multiple of 10 or 100, then adjust. I can develop further the relationship between addition and subtraction. I can use known number facts and place value for mental addition and subtraction (e.g. 810 – 380, 9.2 – 8.6).
Should	**Should**	**Should**
I can find a small difference by counting up (e.g. 5003 – 4996). I can count on or back in repeated steps of 1,10 or 100. I can add or subtract the nearest multiple of 10, then adjust. I can continue to use the relationship between addition and subtraction. I can use known number facts and place value to add or subtract mentally, including any pair of two-digit whole numbers.	I can find differences by counting up through next multiple of 10, 100 or 1000, e.g. calculate mentally a difference such as 8006 – 2993. I can add or subtract the nearest multiple of 10 or 100, then adjust. I can develop further the relationship between addition and subtraction. I can use known number facts and place value for mental addition and subtraction (e.g. 810 – 380, 9.2 – 8.6).	I can find a difference by counting up; add or subtract the nearest multiple of 10, 100 or 1000, then adjust. I can use the relationship between addition and subtraction. I can use known number facts and place value to consolidate mental addition/subtraction (e.g 810 – 380, 9.2 – 8.6). I can use informal pencil and paper methods to support record or explain subtractions. I can extend written methods to column subtraction of numbers involving decimals.
Could	**Could**	**Could**
I can find differences by counting up through next multiple of 10, 100 or 1000, e.g. calculate mentally a difference such as 8006 – 2993. I can add or subtract the nearest multiple of 10 or 100, then adjust.	I can find a difference by counting up; add or subtract the nearest multiple of 10, 100 or 1000, then adjust. I can use the relationship between addition and subtraction. I can use known number facts and place value to	I can use informal pencil and paper methods to support record or explain subtractions. I can extend written methods to column subtraction of numbers involving decimals.

I can develop further the relationship between addition and subtraction. I can use known number facts and place value for mental addition and subtraction (e.g. 810 – 380, 9.2 – 8.6).	consolidate mental addition/subtraction (e.g 810 – 380, 9.2 – 8.6).	

Subtraction

Year 4

- = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

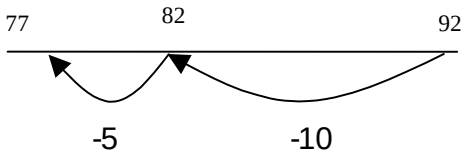
Find a small difference by counting up
e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below).

Subtract the nearest multiple of 10, then adjust.

Continue as in Year 2 and 3 but with appropriate numbers.

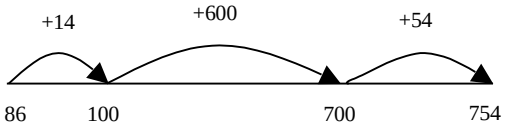
Use known number facts and place value to subtract

92 – 15 = 67



Pencil and paper procedures

Complementary addition
754 – 86 = 668



Year 5

- = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.

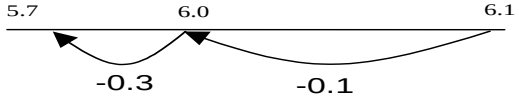
Find a difference by counting up
e.g. 8006 – 2993 = 5013
This can be modelled on an empty number line (see complementary addition below).

Subtract the nearest multiple of 10 or 100, then adjust.

Continue as in Year 2, 3 and 4 but with appropriate numbers.

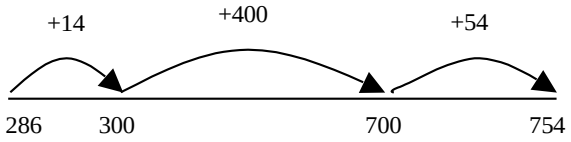
Use known number facts and place value to subtract

6.1 – 0.4 = 5.7



Pencil and paper procedures

Complementary addition
754 – 286 = 468

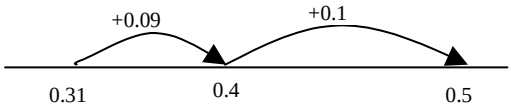


OR ***754 - 286 = 468***

Year 6

- = signs and missing numbers

Continue using a range of equations as in Year 1 and 2 but with appropriate numbers.
Find a difference by counting up
e.g. 0.5 – 0.31 = 0.19
This can be modelled on an empty number line (see complementary addition below).

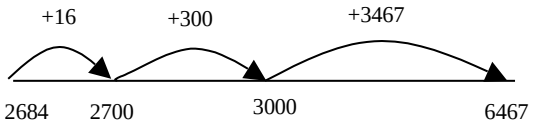


Subtract the nearest multiple of 10, 100 or 1000, then adjust

Continue as in Year 2, 3, 4 and 5 but with appropriate numbers.
Use known number facts and place value to subtract
Continue as year 5

Pencil and paper procedures

Complementary addition
6467 – 2684 = 3783



OR ***6467 – 2684 = 3783***

	14 (300) can be refined to 14 (300) 400 (700) 454 (754) 54 (754) 468 468 (Decomposition for G&T children only when secure.)	16 (2700) can be refined to 316 (3000) 300 (3000) 3467 (6467) 3467 (6467) 3783 3783 (Decomposition for G&T children only when secure.)
Multiplication		
Year 1	Year 2	Year 3
Must	**Must**	**Must**
		I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental calculations in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and use halving as the inverse of doubling. I use known number facts and place value to carry out mentally simple multiplications.
Should	**Should**	**Should**
	I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental calculations in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and use halving as the inverse of doubling. I use known number facts and place value to carry out mentally simple multiplications.	I know that multiplication can be done in any order. I recognise that division is the inverse of multiplication, and that halving is the inverse of doubling. I know that to multiply by 10/100, I shift the digits one/two places to the left. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry out mentally simple multiplications.
Could	**Could**	**Could**
I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental calculations in a number sentence. I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and use halving as the inverse of doubling. I use known number facts and place value to carry out mentally simple multiplications.	I can read and begin to write the related vocabulary. I know that multiplication can be done in any order. I recognise that division is the inverse of multiplication, and that halving is the inverse of doubling. I know that to multiply by 10/100, I shift the digits one/two places to the left. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry	I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 4, by doubling, then double again; I can multiply by 5, by multiplying by 10 then halving; I can find the 8 times-table facts by doubling the 4 times-table; I can use closely related facts (e.g. to multiply by 9 or 11, multiply by 10 and adjust; I can develop the x6 table from the x4 and x2 tables). I can partition numbers to complete multiplication

	out mentally simple multiplications.	questions. (e.g. 23 x 4 = (20 x 4) + (3 x 4)). I can use the relationship between x and ÷ to solve calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).

Multiplication

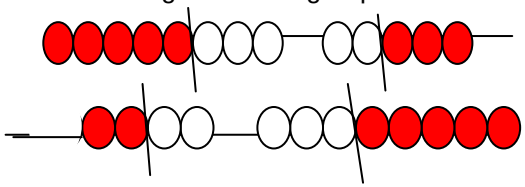
Year 1

Pictures and symbols

There are 3 sweets in one bag.
How many sweets are there in 5 bags?

(Recording on a number line modelled by the teacher when solving problems)

Use of bead strings to model groups of.

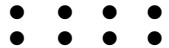


Year 2

x = signs and missing numbers

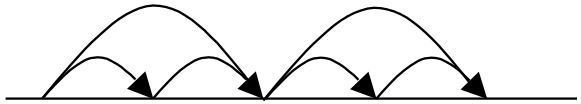
7 x 2 = □ □ = 2 x 7
7 x □ = 14 14 = □ x 7
□ x 2 = 14 14 = 2 x □
□ x ∇ = 14 14 = □ x ∇

Arrays and repeated addition



4 x 2 or 4 + 4
2 x 4
or repeated addition

2 + 2 + 2 + 2



0 1 2 3 4 5 6 7 8

Doubling multiples of 5 up to 50

15 x 2 = 30

Partition

15 x 2

20 + 10 = 30

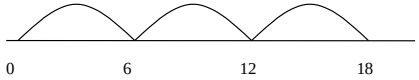
OR

Year 3

x = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Number lines
6 x 3



Arrays and repeated addition
Continue to understand multiplication as repeated addition and continue to use arrays (as in Year 2).

Doubling multiples of 5 up to 50
35 x 2 = 70

Partition

x	30	5
2	60	10

Use known facts and place value to carry out simple

multiplications

Use the same method as above (partitioning),

	x | 10 | 5 2 | 20 | 10 Estimate and then check.	x | 30 | 2 3 | 90 | 6 e.g. 32 x 3 =96 Estimate and then check.
Multiplication		
Year 4	Year 5	Year 6
Must	**Must**	**Must**
I can read and begin to write the related vocabulary. I know that multiplication can be done in any order. I recognise that division is the inverse of multiplication, and that halving is the inverse of doubling. I know that to multiply by 10/100, I shift the digits one/two places to the left. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry out mentally simple multiplications.	I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 4, by doubling, then double again; I can multiply by 5, by multiplying by 10 then halving; I can find the 8 times-table facts by doubling the 4 times-table; I can use closely related facts (e.g. to multiply by 9 or 11, multiply by 10 and adjust; I can develop the x6 table from the x4 and x2 tables). I can partition numbers to complete multiplication questions. (e.g. 23 x 4 = (20 x 4) + (3 x 4)). I can use the relationship between x and ÷ to solve calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).	I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 4, by doubling, then double again; I can multiply by 5, by multiplying by 10 then halving; I can find the 8 times-table facts by doubling the 4 times-table; I can use closely related facts (e.g. to multiply by 9 or 11, multiply by 10 and adjust; I can develop the x6 table from the x4 and x2 tables). I can partition numbers to complete multiplication questions. (e.g. 23 x 4 = (20 x 4) + (3 x 4)). I can use the relationship between x and ÷ to solve calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).
Should	**Should**	**Should**
I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 4, by doubling, then double again; I can multiply by 5, by multiplying by 10 then halving; I can find the 8 times-table facts by doubling the 4 times-table; I can use closely related facts (e.g. to multiply by 9 or 11, multiply by 10 and adjust; I can develop the x6 table from the x4 and x2 tables). I can partition numbers to complete multiplication questions. (e.g. 23 x 4 = (20 x 4) + (3 x 4)).	I can use doubling or halving, starting from known facts. For example: double/halve any two-digit number by doubling/halving the tens first; double one number and halve the other; I can multiply by 25, by multiplying by 100 then dividing by 4; I can find the x16 table facts by doubling the x8 table; . I can use factors to help me solve multiplication calculations. (e.g. 8 x 12 = 8 x 4 x 3). I can use closely related facts (e.g. multiply by 19 or 21 by multiplying by 20 and adjusting; I can develop the x12 table from the x10 and x2 tables).	I can use related facts and doubling or halving. For example: double or halve the most significant digit first; I can multiply by 25, by multiplying by 100 and then dividing by 4; I can double one number and halve the other; I can find the x24 table by doubling the x6 table twice. I can use factors to help me solve multiplication calculations (e.g. 35 x 18 = 35 x 6 x 3). I can use closely related facts: for example, multiply by 49 or 51 by multiplying by 50 and adjusting. I can develop the x 17 table by adding facts from the x 10 and x 7 tables.

I can use the relationship between x and ÷ to solve calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).	I can Partition numbers to help me work out multiplication calculations. (e.g. 47 x 6 = (40 x 6) + (7 x 6)). I can use the relationship between multiplication and division to help me solve multiplication calculations. I can use known facts and place value to multiply and divide mentally.	I can partition a number to help me solve multiplication calculations. (e.g. 87 x 6 = (80 x 6) + (7 x 6) I can use the relationship between x and ÷ to help me solve multiplication calculations. I can use known number facts and place value to consolidate mental multiplication and division. I can use approximation to help me estimate a multiplication answer.
Could	**Could**	**Could**
I can use doubling or halving, starting from known facts. For example: double/halve any two-digit number by doubling/halving the tens first; double one number and halve the other; I can multiply by 25, by multiplying by 100 then dividing by 4; I can find the x16 table facts by doubling the x8 table; . I can use factors to help me solve multiplication calculations. (e.g. 8 x 12 = 8 x 4 x 3). I can use closely related facts (e.g. multiply by 19 or 21 by multiplying by 20 and adjusting; I can develop the x12 table from the x10 and x2 tables). I can Partition numbers to help me work out multiplication calculations. (e.g. 47 x 6 = (40 x 6) + (7 x 6)). I can use the relationship between multiplication and division to help me solve multiplication calculations. I can use known facts and place value to multiply and divide mentally.	I can use related facts and doubling or halving. For example: double or halve the most significant digit first; I can multiply by 25, by multiplying by 100 and then dividing by 4; I can double one number and halve the other; I can find the x24 table by doubling the x6 table twice. I can use factors to help me solve multiplication calculations (e.g. 35 x 18 = 35 x 6 x 3). I can use closely related facts: for example, multiply by 49 or 51 by multiplying by 50 and adjusting. I can develop the x 17 table by adding facts from the x 10 and x 7 tables. I can partition a number to help me solve multiplication calculations. (e.g. 87 x 6 = (80 x 6) + (7 x 6) I can use the relationship between x and ÷ to help me solve multiplication calculations. I can use known number facts and place value to consolidate mental multiplication and division. I can use approximation to help me estimate a multiplication answer. I can use informal pencil and paper methods to support, record or explain multiplications. I can extend written methods to: multiplication of ThHTU by U (short multiplication); I can use short multiplication of numbers involving decimals; I can use long multiplication of a three-digit by a two-digit integer to solve a multiplication calculation.	I can use formal pencil and paper methods to support record or explain multiplications. I can extend written methods to: multiplication of ThHTU by TU (long multiplication); I can use long multiplication of numbers involving decimals. I can use long multiplication of a three-digit by a three - digit integer to solve a multiplication calculation.

Multiplication

Year 4

x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers

Partition
23 x 4 = 92

23 x 4 = (20 x 4) + (3 x 4)
= (80) + (12)
= 92

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
23 x 7 is approximately 20 x 10 = 200

Year 5

x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers

Partition
47 x 6 = 92

47 x 6 = (40 x 6) + (7 x 6)
= (240) + (42)
= 282

OR

Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
72 x 38 is approximately 70 x 40 = 2800

x	70	2
30	2100	60
8	560	16

Extend to simple decimals with one decimal place.

12.5

Year 6

x = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers

Partition
87 x 6 = 522

87 x 6 = (80 x 6) + (7 x 6)
= (480) + (42)
= 522

OR

87
X6
42 (6 x 7)
480 (6 x 80)
522 (units, then tens, hundreds etc)

OR
Use the grid method of multiplication (as below)

Pencil and paper procedures
Grid method
372 x 24 is approximately 400 x 20 = 8000

x	300	70	2
20	6000	1400	40
4	1200	280	8

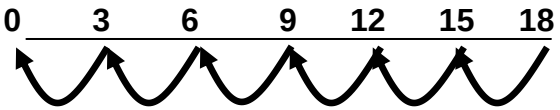
Extend to decimals with up to two decimal places.

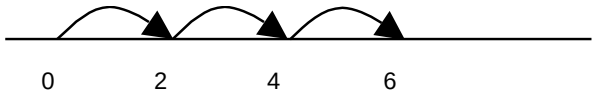
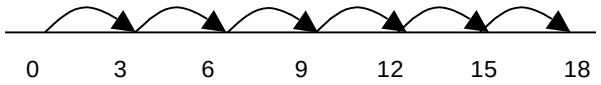
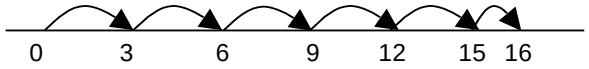
x | 20 | 3 7 | 140 | 21 x | 70 | 2 30 | 2100 | 60 8 | 560 | 16 **Estimate and check.**	x 2 1.0 (2.0 x 0.5) 4.0 (2.0 x 2.0) 20.0 (2.0 x 10.0) 25.0 Moving to formal methods of multiplication for decimals. Carrying numbers underneath. **Estimate and check** G & T formal and written methods	12.5 x2.5 1.25 (2.5 x 0.5) 5.0 (2.5 x 2.0) 25.0 (2.5 x 10.0) 31.25 Moving to formal methods of multiplication for decimals. Carrying numbers underneath. **Estimate and check. – Formal written methods-prepare for sec.**

Division		
Year 1	Year 2	Year 3
Must	**Must**	**Must**
	I can recognise the relationship between sharing equally and division when using the vocabulary 'divide by' and 'share equally' I am beginning to understand division as repeated subtraction or grouping I can recognise the relationship between multiplication and division.	I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental calculations in a number sentence, I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and can use halving as the inverse of doubling. I can use known number facts and place value to carry out mentally simple divisions.
Should	**Should**	**Should**
I can recognise the relationship between sharing equally and division when using the vocabulary 'divide by' and 'share equally' I am beginning to understand division as repeated subtraction or grouping I can recognise the relationship between multiplication and division.	I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental calculations in a number sentence, I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and can use halving as the inverse of doubling. I can use known number facts and place value to carry out mentally simple divisions.	I can read and begin to write the related vocabulary. I can recognise that division is the inverse of multiplication, and halving is the inverse of doubling. I can begin to find remainders after simple division. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry out mentally simple divisions.
Could	**Could**	**Could**
I can use and begin to read the related vocabulary. I can use the x, ÷ and = signs to record mental	I can read and begin to write the related vocabulary. I can recognise that division is the inverse of	I can find remainders after division. I can divide a whole number of pounds by 2, 4, 5 or 10 to

calculations in a number sentence, I can recognise the use of a symbol such as • or △ to stand for an unknown number. I know and can use halving as the inverse of doubling. I can use known number facts and place value to carry out mentally simple divisions.	multiplication, and that halving is the inverse of doubling. I can begin to find remainders after simple division. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry out mentally simple divisions.	give £.p. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 5, by multiplying by 10 then halving; I can find quarters by halving halves. I can use the relationship between multiplication and division to help me solve division calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).

Division

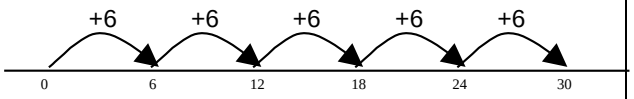
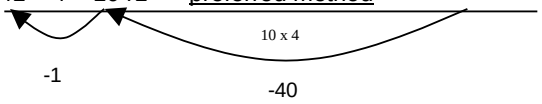
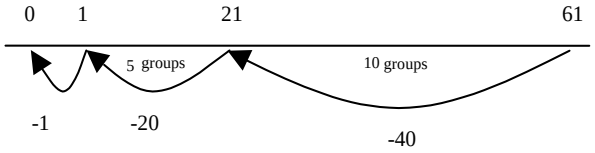
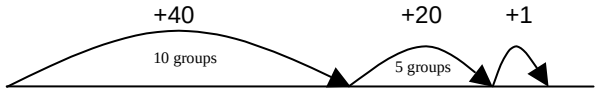
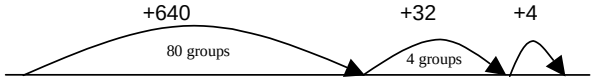
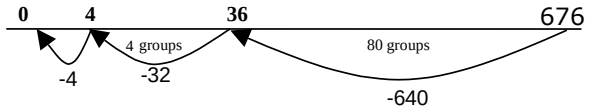
Year 1	Year 2	Year 3
Pictures / marks 12 children get into teams of 4 to play a game. How many teams are there? 	**÷ = signs and missing numbers** 6 ÷ 2 = □ □ = 6 ÷ 2 6 ÷ □ = 3 3 = 6 ÷ □ □ ÷ 2 = 3 3 = □ ÷ 2 □ ÷ ∇ = 3 3 = □ ÷ ∇ **Understand division as sharing and grouping** Sharing – 6 sweets are shared between 2 people. How many do they have each?  6 ÷ 2 can be modelled as: Grouping – There are 6 sweets. How many people can have	**÷ = signs and missing numbers** Continue using a range of equations as in Year 2 but with appropriate numbers. **Understand division as sharing and grouping** 18 ÷ 3 can be modelled as: Sharing – 18 shared between 3 (see Year 2 diagram) OR  Or Grouping - How many 3's make 18?

	2 each? (How many 2's make 6?)  	 Remainders 16 ÷ 3 = 5 r1 Sharing - 16 shared between 3, how many left over? Grouping – How many 3's make 16, how many left over? e.g. 

Division		
Year 4	Year 5	Year 6
Must	**Must**	**Must**
I can read and begin to write the related vocabulary. I can recognise that division is the inverse of multiplication, and that halving is the inverse of doubling. I can begin to find remainders after simple division. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts (e.g. 8 x 4 is double 4 x 4). I can say or write a division statement corresponding to a given multiplication statement. I can use known number facts and place value to carry out mentally simple divisions.	I can find remainders after division. I can divide a whole number of pounds by 2, 4, 5 or 10 to give £.p. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 5, by multiplying by 10 then halving; I can find quarters by halving halves. I can use the relationship between multiplication and division to help me solve division calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).	I can begin to use brackets to help me solve division calculations. I can begin to express a quotient as a fraction, or as a decimal when dividing a whole number by 2, 4, 5 or 10, or when dividing £.p. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts. For example: double/halve any two-digit number by doubling/halving the tens first; double one number and halve the other; I can multiply by 25, by multiplying by 100 then dividing by 4; I can find sixths by halving thirds. I can use the relationship between multiplication and Division to help me solve division calculations. I can use known facts and place value to multiply and divide mentally.
Should	**Should**	**Should**
I can find remainders after division. I can divide a whole number of pounds by 2, 4, 5 or 10 to give £.p. I can round up or down after division, depending on	I can begin to use brackets to help me solve division calculations. I can begin to express a quotient as a fraction, or as a decimal when dividing a whole number by 2, 4,	I can express a quotient as a fraction or as a decimal rounded to one decimal place. I can divide £.p by a two-digit number to give £.p. I can round up or down after division, depending on the

the context. I can use doubling or halving, starting from known facts. For example: double/halve two-digit numbers by doubling/halving the tens first; I can multiply by 5, by multiplying by 10 then halving; I can find quarters by halving halves. I can use the relationship between multiplication and division to help me solve division calculations. I can use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole-number answers).	5 or 10, or when dividing £.p. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts. For example: double/halve any two-digit number by doubling/halving the tens first; double one number and halve the other; I can multiply by 25, by multiplying by 100 then dividing by 4; I can find sixths by halving thirds. I can use the relationship between multiplication and Division to help me solve division calculations. I can use known facts and place value to multiply and divide mentally.	context. I can use related facts and doubling or halving. For example: double or halve the most significant digit first; I can multiply by 25, by multiplying by 100 then dividing by 4; I can double one number and halve the other. I can use the relationship between multiplication and division to help me solve division calculations. I can use known number facts and place value to consolidate mental multiplication and division. I can use approximation first when solving division calculations. I can use informal pencil and paper methods to support record or explain divisions. I can use written methods of short division to solve division calculations of TU or HTU by U (mixed-number answer); I can use long division to solve division calculations of HTU by TU (long division, whole-number answer); I can use short division of numbers involving decimals.
Could	**Could**	**Could**
I can begin to use brackets to help me solve division calculations. I can begin to express a quotient as a fraction, or as a decimal when dividing a whole number by 2, 4, 5 or 10, or when dividing £.p. I can round up or down after division, depending on the context. I can use doubling or halving, starting from known facts. For example: double/halve any two-digit number by doubling/halving the tens first; double one number and halve the other; I can multiply by 25, by multiplying by 100 then dividing by 4; I can find sixths by halving thirds. I can use the relationship between multiplication and Division to help me solve division calculations. I can use known facts and place value to multiply and divide mentally.	I can express a quotient as a fraction or as a decimal rounded to one decimal place. I can divide £.p by a two-digit number to give £.p. I can round up or down after division, depending on the context. I can use related facts and doubling or halving. For example: double or halve the most significant digit first; I can multiply by 25, by multiplying by 100 then dividing by 4; I can double one number and halve the other. I can use the relationship between multiplication and division to help me solve division calculations. I can use known number facts and place value to consolidate mental multiplication and division. I can use approximation first when solving division calculations. I can use informal pencil and paper methods to support record or explain divisions. I can use written methods of short division to solve	I can use formal pencil and paper methods to support record or explain divisions. I can use written methods of long division to solve division calculations of TU or HTU by TU (mixed-number answer); I can use long division to solve division calculations of HTU by HTU (long division, whole-number answer); I can use long division of numbers involving decimals.

	division calculations of TU or HTU by U (mixed-number answer); I can use long division to solve division calculations of HTU by TU (long division, whole-number answer); I can use short division of numbers involving decimals.	

Division		
Year 4	Year 5	Year 6
÷ = signs and missing numbers Continue using a range of equations as in Year 2 but with appropriate numbers. **Sharing and grouping** 30 ÷ 6 can be modelled as: grouping – groups of 6 taken away and the number of groups counted e.g.  sharing – sharing among 6, the number given to each person Remainders 41 ÷ 4 = 10 r1 - preferred method   	**÷ = signs and missing numbers** Continue using a range of equations as in Year 2 but with appropriate numbers. **Sharing and grouping** Continue to understand division as both sharing and grouping (repeated subtraction). **Remainders** Quotients expressed as fractions or decimal fractions 61 ÷ 4 = 15 ¼ or 15.25 - preferred method   **Pencil and paper procedures**	**÷ = signs and missing numbers** Continue using a range of equations as in Year 2 but with appropriate numbers. **Sharing and grouping** Continue to understand division as both sharing and grouping (repeated subtraction). **Remainders** Quotients expressed as fractions or decimal fractions 676 ÷ 8 = 84.5 -preferred method  OR  **Pencil and paper procedures** 977 ÷ 36 is approximately 1000 ÷ 40 = 25

0 1 41 OR 41 = (10 x 4) + 1 **Pencil and paper procedures** 72 ÷ 5 lies between 50 ÷ 5 = 10 and 100 ÷ 5 = 20 72 - 50 (10 groups) or (10 x 5) 22 - 20 (4 groups) or (4 x 5) 2 Answer : 14 remainder 2	256 ÷ 7 lies between 210 ÷ 7 = 30 and 280 ÷ 7 = 40 256 - 70 (10 groups) or (10 x 7) 186 - 140 (20 groups) or (20 x 7) 46 - 42 (6 groups) or (6 x 7) 4 (36 groups) or (36) Answer: 36 remainder 4 **More able year 5 to do formal method**	977 - 360 (10 groups) 617 - 360 (10 groups) 257 - 180 (5 groups) 77 - 72 (2 groups) 5 Answer: 27 $^{5}/_{36}$ 977 - 720 (20 groups) 257 - 180 (5 groups) 77 - 72 (2 groups) 5 **refine to** **More able year 6 to do formal method for sec. prep**.