Year 1

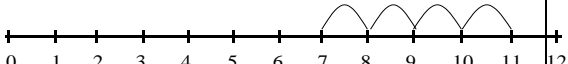| Addition	Subtraction	Multiplication	Division

+ = signs and missing numbers
 	
$3 + 4 = \square$ $\square = 3 + 4$
$3 + \square = 7$ $7 = \square + 4$
$\square + 4 = 7$ $7 = 3 + \square$
$\square + \nabla = 7$ $7 = \square + \nabla$
 	
Promoting covering up of operations and numbers.
 	
Number lines (numbered)
 	
  $7 + 4$
 	
0 1 2 3 4 5 6 7 8 9 10 11 12
 	
Recording by - drawing jumps on prepared lines
 	
    o   constructing own lines
 	
(Teacher model number lines with missing numbers)
 	
(Teachers model jottings appropriate for larger numbers)
	Pictures / marks
	Sam spent 4p. What was his change from 10p?
	
	- = signs and missing numbers
	$7 - 3 = \square$ $\square = 7 - 3$
	$7 - \square = 4$ $4 = \square - 3$
	$\square - 3 = 4$ $4 = 7 - \square$
	$\square - \nabla = 4$ $4 = \square - \nabla$
	
	Number lines (numbered)
	
	  $11 - 7$
	(Counting back)
	
	0 1 2 3 4 5 6 7 8 9 10 11 12
	
	The difference between 7 and 11
	(Counting up)
	
	0 1 2 3 4 5 6 7 8 9 10 11 12
	
	Recording by - drawing jumps on prepared lines
	     - constructing own lines
	
	(Teachers model jottings appropriate for larger numbers)
		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.
		
			Pictures / marks
			12 children get into teams of 4 to play a game. How many teams are there?

Year 2

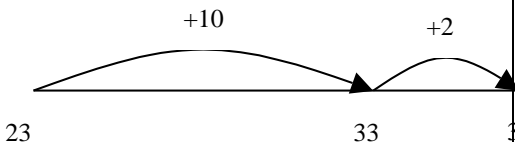| Addition	Subtraction	Multiplication	Division

Addition

+ = signs and missing numbers

Continue using a range of equations as in Year 1 but with appropriate, larger numbers.
Extend to
$14 + 5 = 10 + \square$
and adding three numbers
$32 + \square + \square = 100$ $35 = 1 + \square + 5$
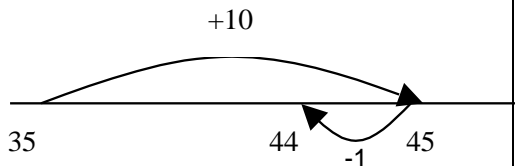
Partition into tens and ones and recombine

$12 + 23 = 10 + 2 + 20 + 3$
$\quad\quad = 30 + 5$
$\quad\quad = 35$

refine to partitioning the second number only:

$23 + 12 = 23 + 10 + 2$
$\quad\quad = 33 + 2$
$\quad\quad = 35$

+10 ... +2

23 ... 33 ... 35

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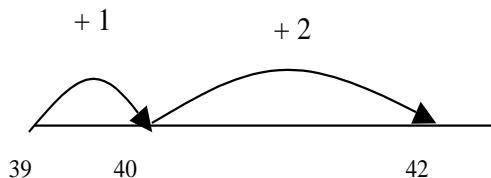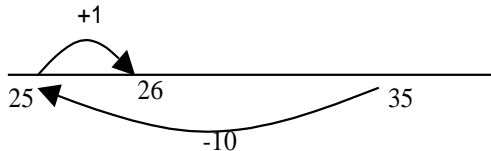$35 + 9 = 44$

+10

35 ... 44 ... 45
-1

Subtraction

- = signs and missing numbers

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

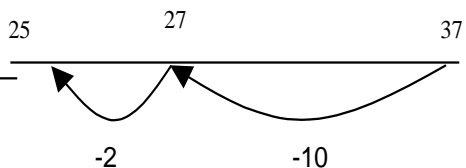**Find a small difference by counting up**

$42 – 39 = 3$

+ 1 ... + 2

39 ... 40 ... 42

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

+1

25 ... 26 ... 35
-10

Use known number facts and place value to subtract (partition second number only)

$37 – 12 = 37 – 10 – 2$
$\quad\quad = 27 – 2$
$\quad\quad = 25$

25 ... 27 ... 37

-2 ... -10

Multiplication

x = signs and missing numbers

$7 \times 2 = \square$ $\quad\quad \square = 2 \times 7$
$7 \times \square = 14$ $\quad\quad 14 = \square \times 7$
$\square \times 2 = 14$ $\quad\quad 14 = 2 \times \square$
$\square \times \nabla = 14$ $\quad\quad 14 = \square \times \nabla$

Arrays and repeated addition

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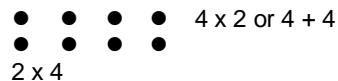
or repeated addition

$2 + 2 + 2 + 2$

0 1 2 3 4 5 6 7 8
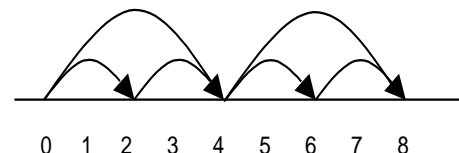
Doubling multiples of 5 up to 50

$15 \times 2 = 30$

Partition

15 x 2

$20 + 10 = 30$

OR

x	10	5
2	20	10

Division

÷ = signs and missing numbers

$6 \div 2 = \square$ $\quad\quad \square = 6 \div 2$
$6 \div \square = 3$ $\quad\quad 3 = 6 \div \square$
$\square \div 2 = 3$ $\quad\quad 3 = \square \div 2$
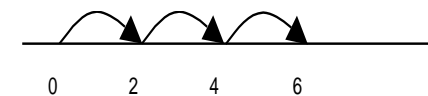$\square \div \nabla = 3$ $\quad\quad 3 = \square \div \nabla$

Understand division as sharing and grouping

Sharing – 6 sweets are shared between 2 people. How many do they have each?

$6 \div 2$ can be modelled as:

Grouping – There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)

0 2 4 6

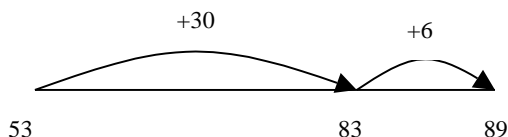| Year 3			
Addition	Subtraction	Multiplication	Division

Addition

+ = 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

+30   +6

53   83   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
+40 + 2	+ 42
120 + 5 =125	120 (80+40)
	5 (3+2)
	125

Subtraction

- = 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
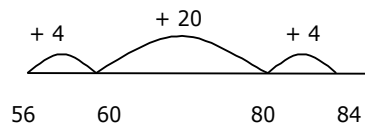**Continue as in Year 2 but with appropriate numbers e.g. 78 – 49 is the same as 78 – 50 + 1**

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

82   87   97

-5   -10
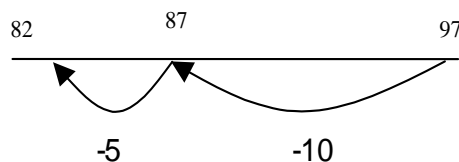
Pencil and paper procedures
Complementary addition
84 – 56 = 28

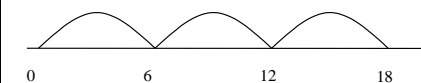+ 4   + 20   + 4

56   60   80   84

Multiplication

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

Number lines
6 x 3

0   6   12   18

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), e.g. 32 x 3 = 96

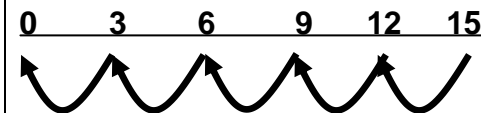| x	30	2
3	90	6

Division

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

Understand division as sharing and grouping
15 ÷ 3 can be modelled as:
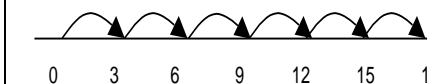Sharing – 15 shared between 3 (see Year 2 diagram)
OR

0   3   6   9   12   15

Or
18 ÷ 3 can be modelled as:
Sharing – 18 shared between 3 (see Year 2 diagram)

Grouping - How many 3's make 18?

0   3   6   9   12   15   18

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.

0   3   6   9   12   15 16

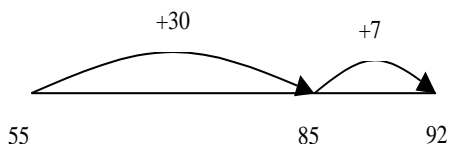| Year 4			
Addition	Subtraction	Multiplication	Division

Addition

+ = 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              358
+    70+3               73
 300+120+11 = 431       11
                       120
                       300
                       431
```
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.)

Subtraction

- = 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
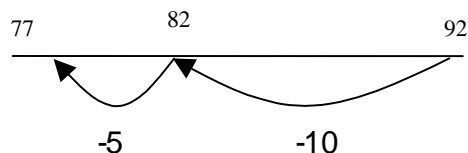e.g. 5003 – 4996 = 7
This can be modelled on an empty number line (see complementary addition below).

Subtract the nearest multiple of 10, then adjust.
Continue as in Year 2 and 3 but with appropriate numbers.

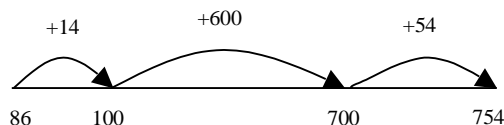**Use known number facts and place value to subtract**
92 – 15 = 77

Pencil and paper procedures
Complementary addition
754 – 86 = 668

Multiplication

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

x	20	3
7	140	21

x	70	2
30	2100	60
8	560	16

```
   32
  X4
    8 (2x4)
  120 (30x4)
  128
```
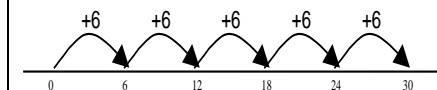
Division

÷ = signs and missing numbers
Continue using a range of equations as in Year 2 but with appropriate numbers.
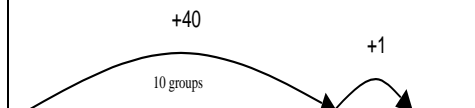
Sharing and grouping
30 ÷ 6 can be modelled as:
grouping – groups of 6 taken away and the number of groups counted e.g.
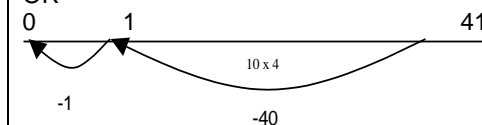

sharing – sharing among 6, the number given to each person
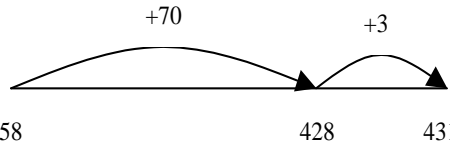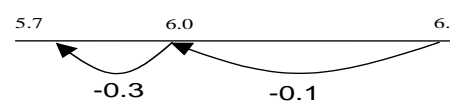
Remainders
41 ÷ 4 = 10 r1
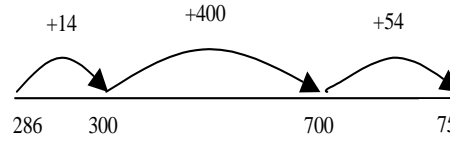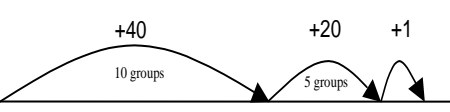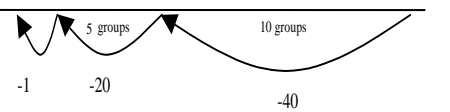

OR   41 = (10 x 4) + 1
Pencil and paper procedures
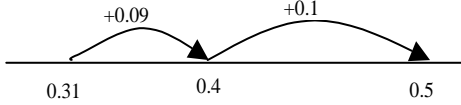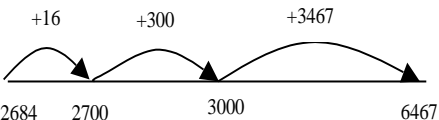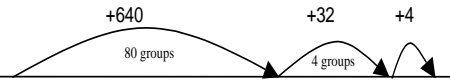72 ÷ 5 **Key question! Have I got 10 lots of 5? Yes**
```
    72
-   50   (10 groups) or (10 x 5)
    22
-   20   (4 groups) or (4 x 5)
     2
```
Answer : 14 remainder 2

Calculation Policy Guidance – A.I.S.   12/03/2013

Year 5 (use of estimates throughout)

Addition	Subtraction	Multiplication	Division

+ = signs and missing numbers
Continue using a range of equations as in Year 1 and 2 but with appropriate numbers. 2 and 3 digits
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
 	
+70   +3
 	
358   428   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
 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.
	- = 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
	
	5.7 6.0 6.1
	-0.3 -0.1
	
	## Pencil and paper procedures
	Complementary addition
	754 – 286 = 468
	
	+14 +400 +54
	
	286 300 700 754
	OR
	  754 - 286 = 468
	Expanded subtraction
	
	₆₀₀/700 ₁60 4
	- 300 90 3
	  300 70 1
	14 (300) can be refined to 14 (300)
	400 (700) 454 (754)
	 54 (754) 468
	 468
	Compact/ traditional method when ready
		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) 2 digit by one digit
		
		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. **6.2 x 9** | x	6	0.2

9	54	1.8 = |
		54+1.8 =55.8
		6.2
		x 9
		 1.8 (9.0 x 0.2)
		54.0 (9.0 x 60)
		55.8
			÷ = 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).
			Using 2 digit exact multiples 72÷ 8 = □
			64÷□=8
			Remainders
			Quotients expressed as fractions or decimal fractions
			61 ÷ 4 = 15 ¼ or 15.25
			
			+40 +20 +1
			10 groups 5 groups
			
			OR
			0 1 21 61
			5 groups 10 groups
			-1 -20 -40
			
			Pencil and paper procedures
			256 ÷ 7 **Key question! Have I got 10 lots (20,30 etc) of 7?**
			  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

Year 6			
Addition	Subtraction	Multiplication	Division
+ = 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 +7　　　　　　　+0.3 35.8　　　　　42.8　　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 　242.15 　　　11 Revert to expanded methods if the children experience any difficulty. Extend to decimals (either one or two decimal places).	**- = 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). +0.09　　　　+0.1 0.31　　0.4　　　　0.5 **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 +16　　+300　　　+3467 2684　2700　　3000　　　6467 ***OR　　　　6467 – 2684 = 3783*** 　16 (2700)　　can be refined to 　316 (3000) 　300 (3000) 　3467 (6467) 　3467 (6467) 　3783 　3783 **(Decomposition for G&T children only when secure.)**	**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. 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.	**÷ = 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 +640　　　　+32　　+4 80 groups　　　4 groups OR **Pencil and paper procedures** 977 ÷ 36 is approximately 1000 ÷ 40 = 25 **Key question! Have I got 10, 20, 50 lots of 36?** 　977　　　　　　　　977 - 　360　(10 groups)　　720　20grps 　617　　　　　　　　257 - 　360　(10 groups)　**refine**　180　5 grps 　257　　　　　　**to**　　77 - 　180　(5 groups)　　　72　2grps 　77　　　　　　　　　5 - 　72　(2 groups) 　5 Answer: 27 $^5/_{36}$ **Decimal division by 1 digit** 　0 3 . 3　6 5⟌1 6 . 8　0

	Early Years 2		
Addition	Subtraction	Multiplication	Division

Addition

+/ = signs

Count on from a fixed number when combining two groups of objects

2 dice
  Or
Little blocks
  Or
Real life things

4 + 2 =
3 + 1 =
6 + 6 =

Number Lines

Fill in the missing number

0 1 2 ☐ 4 ☐ 6 ☐

Find one more

Make friends of 10 eg. 9 +1, 7 + 3, 6 + 4

Subtraction

-/ = signs

Count back from a fixed number when taking away

Little blocks
  Or
Real life things

10 - 9 =
9 - 1 =
8 - 2 =

Find two less/ fewer

Number line   Fill in the missing number

10 9 8 ☐ ☐ 6 ☐

Multiplication

X / = signs

Count groups of the same number of objects and add them together

Real life things

Apples, eggs blocks

5 x 2 = 10

Division

÷ /= signs

Real life things, making groups of children

Divide 12 Easter eggs between 4 baskets

Divide 8 apples between 4 children. How many does each child receive?