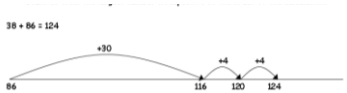
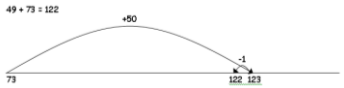
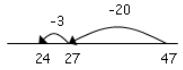
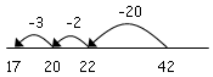
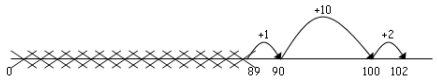
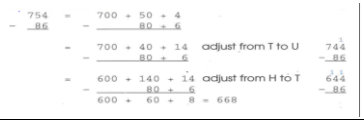
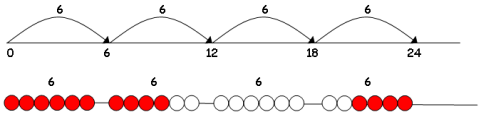
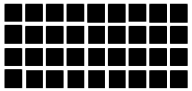
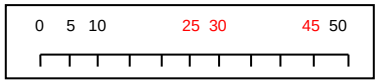
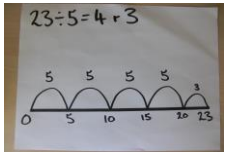
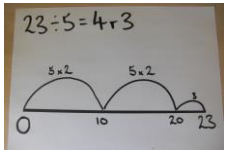
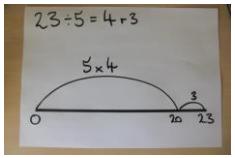
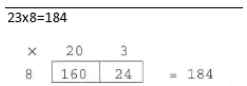
In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them.
Encourage children to choose and use the most efficient and appropriate method for the numbers and the situation.

	Addition	Subtraction	Multiplication	Division
Y3	Children will read and write numbers up to 1000 in numbers and words including Roman numerals from 1 to 12. Children will count in tenths recognising that tenths arise from dividing an object into 10 equal parts. Children will mentally add 3 digit numbers and ones, 3 digit numbers and 10's, 3 digit numbers and 100's. Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate. **Counting on** Count on from the largest number irrespective of the order of the calculation. Bridge through tens and begin to bridge through 100's.  **Compensation (for near multiples of 10)**  Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies. **Expanded informal method using place value** Children will add numbers with up to 3 digits using formal methods of column addition. Encourage children to use this when the calculation can't be done mentally. Model with simpler numbers where they can solve mentally initially 67 = 60 + 7 +24 20 + 4 80 + 11 = 91 Model expanded horizontal partitioning (see above)… leading to compact vertical method working from left to right…… then from right to left. 67 67 + 24 +24 11 91 80 1 91 Early decimal notation through the concept of money. Knowing what the decimal point means and how the pence are recorded after the decimal point e.g. £1. 09 NOT £ 1.9!	Children will continue to use empty number lines with increasingly large numbers. Children will begin to use informal pencil and paper methods (jottings). **Counting back** Subtracting the tens in one jump and the units in one jump (focus on efficiency… e.g. challenge children to solve subtraction calculation in two steps) 47 – 23 = 24  Partial mental method: 47 – 20 = 27 27 -3 = 24 Bridging through ten can help children become more efficient. 42 – 25 = 17  Moving into…… **…..Counting on** Finding the difference between two numbers by counting on. Using images from ICT. Relate to every day contexts such as age, height, length etc. Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used. 102 – 89 = 13  Children will start to see the links between addition and subtraction through the use of inverse operation to check calculations ie: 29 -12 = 17 because 17 + 12 = 29 Children should subtract numbers with up to 3 digits using the formal written method of column subtraction 	Children will count from 0 in 4's, 8's, 50's and 100's Children need to know multiplication facts for the 3, 4, and 8 times tables. Children will continue to use: **Repeated addition** 6 multiplied by 4 = 6 x 4 = 6 'four times' 6 times 4 is 6 + 6 + 6 + 6 = 24 or 4 lots of 6 Children should use number lines, Numicon or bead bars to support.   **Arrays** Increasingly use arrays to make links between x and ÷. Children should model a multiplication calculation using an array. This knowledge will support the development of the grid method.  **9 x 4 = 36** **4 x 9 = 36** **36÷ 9 = 4 36 ÷ 4 = 9** Important for teachers to be consistent. Either seen as a row of 9, 4 times (9 x 4)… or a column of 4, 9 times (4 x 9). Both are right. **Derive facts from known facts** Use number line to show known multiplication facts and then derive unknown facts. E.g. if you know 5 x 10 = 50. Count back 5 to derive 5 x 9 etc. 5 x 5 will be half of 5 x 10 etc… Relate to other 'tables'.  **Scaling** Use Base 10 equipment to show 10 times bigger / smaller. Model the enlargement. E.g to show why 6 x 3 helps in solving the calculation 60 x3. Find a ribbon that is 4 times as long as the blue ribbon  **Early Algebra** Using symbols to stand for unknown numbers to complete equations using inverse operations ☐ x 5 = 20 3 x △ = 18 ☐ x O = 32	Children need to know division facts for the 3, 4, and 8 times tables. Ensure that the emphasis in Y3 is on **grouping** rather than sharing. Children will continue to use number lines and known multiplication facts to solve division. Use number lines and known multiplications to solve divisions including those with remainders. Move into chunking using these steps. Encourage children to be as efficient as possible. 23 ÷ 5   Moving towards more efficient approaches….   **Early Algebra** Using symbols to stand for unknown numbers to complete equations using inverse operations 26 ÷ 2 = ☐ 24 ÷ △ = 12 ☐ ÷ 10 = 8 **Find unit fractions of numbers and quantities** Start to relate fractions to division in context e.g. a cake recipe for 8 people uses 500g of flour. How much flour would I need to make a cake for 4 people?

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.

In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them.
Encourage children to choose and use the most efficient and appropriate method for the numbers and the situation.

			Partitioning 23 x 8 = (20 x 8) + (3 x 8) = 160 + 24 = 184  Children will write and calculate mathematical statements for multiplication for the tables they know including for 2 digit numbers x 1 digit numbers progressing from mental to formal written methods e.g. 600 ÷ 3 = 200 can be derived from 2 x 3 =6	½ ⅓ ¼ ⅙ of e.g. 12 litres **Vocabulary for addition** plus more than the sum of total increase by **Vocabulary for subtraction** minus less than fewer than subtract difference between take away **Vocabulary for multiplication** times multiples sets of lots of multiplied by groups of **Vocabulary for division** grouping sets of/groups of divided into divided by divisible by fractions

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.

In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them.
Encourage children to choose and use the most efficient and appropriate method for the numbers and the situation.

Y4

Count in multiples of 6,7,9 25 and 1000.
Count backwards through zero to include negative numbers.
Find thousand more or less than a given number.
Order and compare numbers beyond a thousand.
Read Roman numerals to 100.

Expanded informal method leading to compact method

```
 67  = 60 + 7
+24    20 + 4
       80 + 11  =  91
```

Model expanded horizontal partitioning (see above)…

…leading to compact vertical method working from left to right, then from right to left.

```
 67     67
+24   + 24
 80     11
 11     80
 91     91
```

Moving quickly into 3 digit numbers for calculations that are hard to solve mentally.

```
 625   625
+ 48  + 48
 600    13
  60    60
  13   600
 673   673
```

Model how solving an addition on an empty number line increasingly becomes less efficient as the complexity and size of numbers increases.

Moving into compact method

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

Early decimals

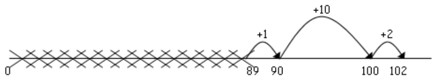
Compare and order numbers with 2 decimal places.
To be able to count in sequences of tenths and recognise that this is part of the whole. To be able to explain how the numbers bridge over a whole number.
Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*
- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p*

Difference by counting on (See Y3)

For numbers close together:

102 – 89 = 13



Moving into e.g. 754 – 86…… 754 – 286….

Children should:

- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;*
- ✓ *solve with increasing efficiency using only two steps*

Counting back

When appropriate (using number lines to support) bridging through 10, 100 and 1000 and rounding and adjusting (compensating)

e.g. 42 – 5 193 – 8 706 – 8 307 – 11 823 – 32 1006 - 9 etc

```
          -3        -2
_______________________
       37       40       42
```

Children should subtract numbers with up to 4 digits using the formal written method of column subtraction

```
  754  =  700 + 50 + 4
- 286     200 + 80 + 6               leading to

       =  700 +  40 + 14      744
          200 +  80 +  6    - 286

       =  600 + 140 + 14      644      754
          200 +  80 +  6    - 286    - 286
          400 +  60 +  8      468      468
```

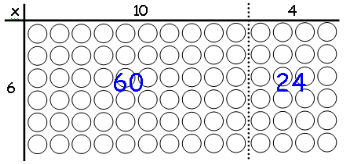
Children should know all multiplication facts up to 12 x 12

Multiply 3 one digit numbers
2x3x4=24

Partitioning using place value and the distributive law
(continuing from Y3)

38 x 5 = (30 x 5) + (8 x 5)
= 150 + 40
= 190

Children will continue to use arrays where appropriate leading into the grid method of multiplication.



(10 x 6) + (4 x 6)

60 + 24

84

Grid method

(Short multiplication – multiplication by a single digit)
23 x 8
Children will approximate first
23 x 8 is approximately 25 x 8 = 200

x	20	3
8	160	24

```
  160
+  24
  184
```

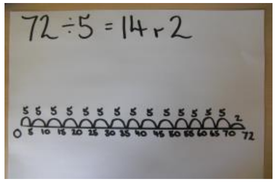
This can then be recorded in a more compact way

```
  23
  X8
  24
 160
 184
```

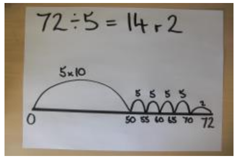
Children should know all related division facts up to 12 x 12

Number lines and known multiplication facts to solve division

Children will continue to develop their use of number lines and known multiplication facts to solve division (using known multiples of the divisor). Initially, these should be multiples of 10s, 5s, 2s and 1s – numbers with which the children are more familiar.



Moving towards more efficient approaches….



Then onto the expanded written method:

Short division TU ÷ U

Illustrate using horizontal and vertical bead bar to make link between number line and vertical method.

72 ÷ 3

```
3 ) 72
  - 30    10x
    42
  - 30    10x
    12
  -  6     2x
     6
  -  6     2x
     0
Answer :  24
```

Leading to subtraction of other multiples.

96 ÷ 6

```
      16
6 )   96
    - 60    10x
      36
    - 36     6x
       0
Answer :    16
```

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.

In order to encourage children to work mentally, calculations should always be presented horizontally so children can make decisions about how to tackle them.
Encourage children to choose and use the most efficient and appropriate method for the numbers and the situation.

	Compensation Continue to teach compensation method where children round and adjust to the nearest 10 / 100, especially in the context of money. E.g. £4.99 + £6.99 = £5 – 1p + £7 – 1p = £11.98			52÷3 (30 +22)÷3 30÷3 + 22÷3 10 + 7 r 1 Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2. Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division depending on context. **Vocabulary for addition** plus more than add the sum of total **Vocabulary for subtraction** count back subtract difference take away **Vocabulary for multiplication** group of product multiply multiplied by times bigger times longer **Vocabulary for division** factor times smaller/shorter group share fractions

Encourage children to check results by using the inverse, using a different method e.g. equivalent calculation and by estimation where appropriate.