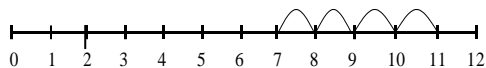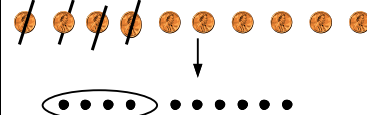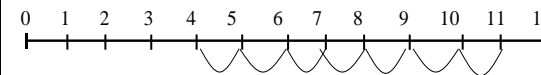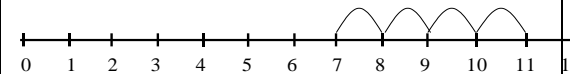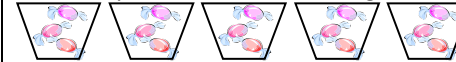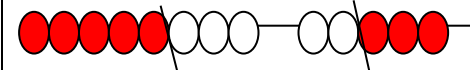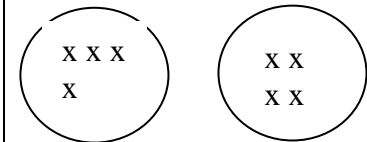| **Year 1**			
Addition Add, sum, plus, increase, total, altogether.	**Subtraction** Take away, minus, decrease, find the different, count back, less, fewer	**Multiplication** Times, multiply, find the product, lots of.	**Division** Divide, share equally, put into groups of, split,
Children will use a variety of different informal methods. They will continue their work from reception, focussing on counting the total number of objects before counting on from the bigger number. They will use pictures, number lines and diagrams for this. **Pictures/Marks** **Number lines (numbered)** 7 + 4 Recording by - drawing jumps on prepared lines Children to construct own lines (Teacher model number lines with missing numbers)	Children in year one will focus on practical methods and songs/rhymes, for example – ten in the bed. Children will also practice counting backwards often with the use of counting beads or their fingers. They will often use diagrams where they can physically take away or cross off objects. **Pictures / marks** Sam spent 4p. What was his change from 10p? **Number lines (numbered)** 11 – 7 (Counting back) The difference between 7 and 11 (Counting up) Recording by - drawing jumps on prepared lines - constructing own lines Bead string: 	Following on from their work in reception most of the multiplication that year one children do will involve practical equipment and rhymes, for example counting up in twos **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. $3 + 3 + 3 + 3 + 3$ **Arrays**	Year one children will continue their work from early years and will split numbers into equal groups using practical equipment. For example sharing out apples for three different people. **Pictures / marks** 12 children get into teams of 4 to play a game. How many teams are there? **Sharing Circles** ½ of 8 = 4 **Singapore Bar Method**

Bead string:
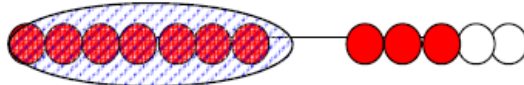
7 + 5 is decomposed / partitioned into 7 + 3 + 2.
The bead string illustrates 'how many more to the next multiple of 10?' (children should identify how their number bonds are being applied) and then 'if we have used 3 of the 5 to get to 10, how many more do we need to add on? (ability to decompose/partition all numbers applied)

7 + 9

Bead string:
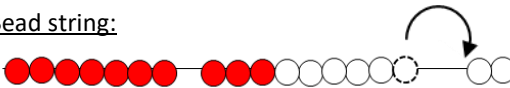
Children find 7, then add on 10 and then adjust by removing 1.

12 – 7 is decomposed / partitioned in 12 – 2 – 5.
The bead string illustrates 'from 12 how many to the last/previous multiple of 10?' and then 'if we have used 2 of the 7 we need to subtract, how many more do we need to count back? (ability to decompose/partition all numbers applied)
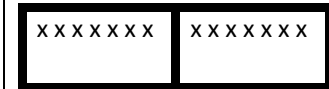
18 – 9

Bead string:

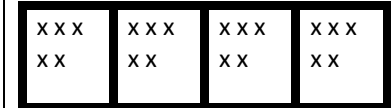Children find 18, then subtract 10 and then adjust by adding 1.
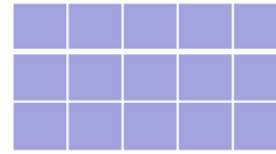
Multiplication is also taught as an array using a diagram or apparatus. Here five multiplied by three is show as three lots of five.

For example ½ of 14 = 7

¼ of 20 = 5

Year 2			
Addition	**Subtraction**	**Multiplication**	**Division**

+ = signs and missing numbers

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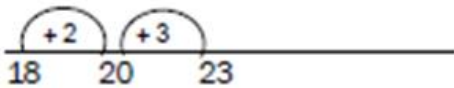
Extend to

14 + 5 = 10 + □ + □

and adding three numbers

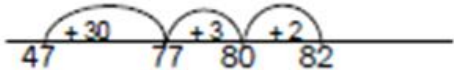32 + □ + □ = 100   35 = 1 + □ + 5

Number line:

The child starts with the larger number. They take the smaller number and split it into its tens and units, these are then added on separately on the number line. Children to understand that 47 + 35 is also 35 + 47 – the commutative law.

18 + 5 = 23

+ 2   + 3
18   20   23

47 + 35 = 82

+ 30   + 3   + 2
47   77   80   82

- = signs and missing numbers

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

Extend to 14 + 5 = 20 - □ = 14

Pupils will continue to use number lines to subtract. The emphasis is on children counting back in more efficient and logical steps.
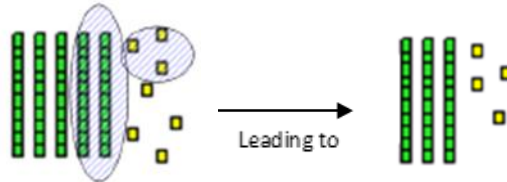
Number line:

74 – 27 =

The child starts with 74 and subtracts the tens. The child can either subtract two lots of ten or 20. The child can then break down the 7 to make the subtraction some manageable. In this example the child has taken away 4 to make 50 and then 3 to get the final total of 47.

47   50   54   74
-3   -4   -20
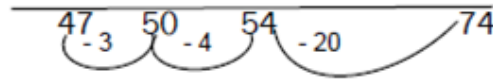
Base 10 equipment:

Children remove the lower quantity from the larger set, starting with the ones and then the tens. In preparation for formal decomposition.

Leading to

Base 10 equipment:

91 – 67 = 24

---

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 2 x 4
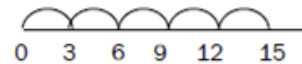
or repeated addition

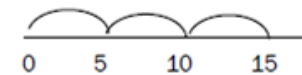2 + 2 + 2 + 2 =
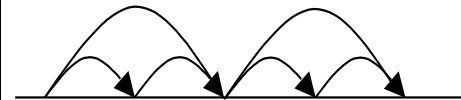
0 1 2 3 4 5 6 7 8

Number line:

As children develop their understanding of number, they are shown that multiplication can be performed by a process of repeated addition. This recognises that three times five is the same as adding five, three times

5 x 3 = 15

0   3   6   9   12   15

Or 3 x 5 = 15

0   5   10   15

÷ = signs and missing numbers

6 ÷ 2 = □   □ = 6 ÷ 2

6 ÷ □ = 3   3 = 6 ÷ □

□ ÷ 2 = 3   3 = □ ÷ 2

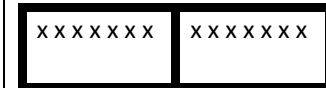□ ÷ ∇ = 3   3 = □ ÷ ∇

Understand division as sharing and grouping

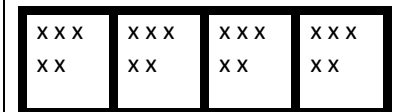Sharing – 6 sweets are shared between 2 people. How many do they have each?

Singapore Method:

For example ½ of 14 = 7

X X X X X X X	X X X X X X X

¼ of 20 = 5

X X X	X X X	X X X	X X X
X X	X X	X X	X X

Partitioning:

Partitioning means splitting. Here both of the two digit numbers are partitioned into their tens and units. First the tens are added together, followed by the units. As with all methods this relies on good recall of number facts.

Partitioning

$47 + 35$

$40 + 30 = 70$

$7 + 5 = 12$

$70 + 12 = 82$

Leading to
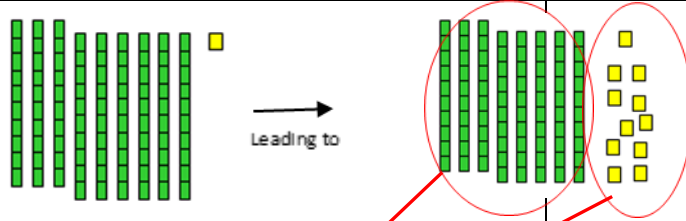
80   11

$$\begin{array}{r} 90 + 1 \\ - \ \ 60 + 7 \\ \hline 20 + 4 \end{array}$$
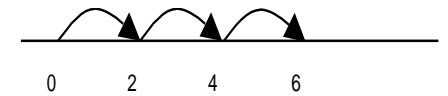
Tens	Ones

$$\begin{array}{r} ^{6}7^{1}2 \\ -25 \\ \hline 47 \end{array}$$

¾ of 20 = 15
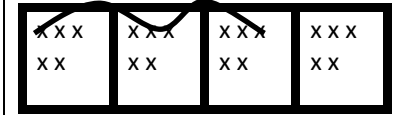
Grouping on a number line
There are 6 sweets. How many people can have 2 each? (How many 2's make 6?)

0   2   4   6

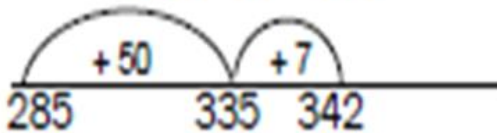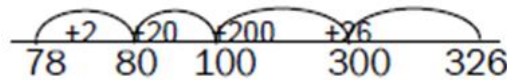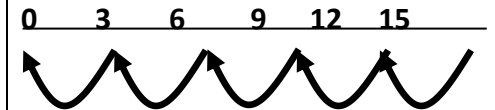| Year 3			
Addition	Subtraction	Multiplication	Division
In year three children will be progressing to larger numbers (3 digit by 3 digit) – often hundreds, tens and ones. They will continue to use and refine methods from key stage one. For example their use of partitioning and a number line will be more efficient, for example bridging (crossing) ten.	As well as consolidating methods used earlier in the school, year three will also subtract by counting on. Here rather than starting with the larger number and counting back, they can start with the smaller number and count up.	Children will continue to apply their times table work to calculate multiplication in a variety of practical ways. They will also develop some informal and practical ways to improve their calculation.	**Understand division as sharing and grouping** $15 \div 3$ can be modelled as: Sharing – 15 shared between 3 (see Year 2 diagram) *OR*
Number line Number line (efficient jumps) 285 + 57 = 342 +50 +7 285 335 342	**Number line:** 326 – 78 = 248 The child could also here do a jump of 20 then 6 rather than a jump of 26. +2 +20 +200 +26 78 80 100 300 326	**Partitioning:** Here the child has partitioned fourteen into ten and four. They then multiply 6 by ten and then four, adding the two answers together. 14 x 6 = 10 x 6 = 60 4 x 6 = 24 60 + 24 = 84	0 3 6 9 12 15 Or $18 \div 3$ can be modelled as: Sharing – 18 shared between 3 (see Year 2 diagram)
Partitioning Partitioning 248 + 132 = 200 + 100 = 300 40 + 30 = 70 8 + 2 = 10 300 + 70 + 10 = 380	**Decomposition** | Tens	Ones | $\overset{6}{7}\overset{1}{2}$ -25 47	Similarly forty seven has been partitioned into forty and seven. The two products have been added. 47 x 8 = 40 x 8 = 320 7 x 8 = 56 320 + 56 = 376	**Grouping** - How many 3's make 18? 0 3 6 9 12 15 18 **Remainders** $16 \div 3 = 5$ 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
		Grid Method: This is a more organised way of presenting the	
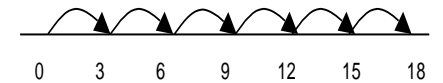
Expanded Column Method

Again the two numbers are partitioned (split) into their hundreds tens and units. The two hundreds are added, followed by the tens and then the units. Finally all of the component parts are added together.
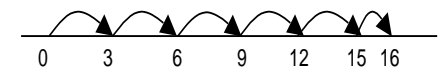
Expanded Column Method

$$374 + 248 =$$

```
  300    70   4
+ 200    40   8
―――――――――――――――
500 + 110 + 12 = 622
```


Hundreds	Tens	Units

Leading to →

```
  3 6 7
+   8 5
―――――――
  4 5 2
    1 1
```

above method. Again forty three is partitioned into forty and three. They are both multiplied by six. The products are then added together.

$$43 \times 6 = 258$$

x	40	3
6	240	18

Number line – chunking

As children improve their understanding of division they can work more efficiently. They may well go up in steps of two (as shown above). They will also move in blocks of ten and in some cases one hundred.

(2 x21)   (2 x21)   (2 x21)

0   42   84   126

Year 4			
Addition	Subtraction	Multiplication	Division
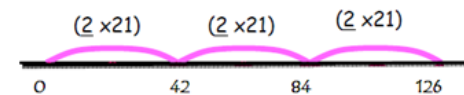
Addition
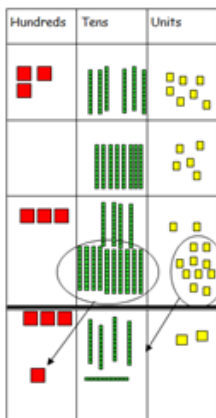
Expanded Column Method

Again the two numbers are partitioned (split) into their hundreds tens and units. The two hundreds are added, followed by the tens and then the units. Finally all of the component parts are added together.

Expanded Column Method

374 + 248 =

```
   300    70   4
 + 200    40   8
 ─────────────────
 500 + 110 + 12 = 622
```

Expanded Vertical Method

This is a building block towards column addition. Children start on the right with the ones' column. Here 4+8 is 12 and this is recorded below the line. Then the tens are added, followed by the hundreds.

Subtraction

Decomposition:

Example: 563 – 271, adjustment from the hundreds to the tens, or partitioning the hundreds

```
500+60+3    400+160+3    500+60+3     563
-200+70+1   -200+70+1    -200+70+1   -271
─────────   ─────────    ─────────   ─────
            200+90+2     200+90+2     292
```

Begin by reading aloud the number from which we are subtracting: 'five hundred and sixty-three'. Then discuss the hundreds, tens and ones components of the number, and how 500 + 60 can be partitioned into 400 + 160. The subtraction of the tens becomes '160 minus 70', an application of subtraction of multiples of ten.

Example: 503 – 278, dealing with zeros when adjusting

```
500+ 0+3    400+90+13    500+0+3     503
-200+70+8   -200+70+ 8   -200+70+8  -278
─────────   ─────────    ─────────   ─────
            200+20+ 5    200+20+5     225
```

Here 0 acts as a place holder for the tens. The adjustment has to be done in two stages. First the 500 + 0 is partitioned into 400 + 100 and then the 100 + 3 is partitioned into 90 + 13.

Multiplication

Grid Method

43 x 6 = 258

x	40	3
6	240	18

Long Multiplication

```
  64      64      64
  x7      x7      x7
 ────    ────    ────
          8      448

 4 x 7 = 28   6 x 7 = 42
           42 + 2 = 44
```

Children to begin to use long multiplication using 1 digit by 2 digit and 1 digit by 3 digits.

Division

Short Division

Here the children use their times tables to understand that 8 goes into 9 only once with 1 remainder. The remainder is placed on the next digit making it 16. The children then work out how many 8's in 16 and put the answer 2 above the bus stop.

$$8\ \overline{)9^16}\ = 12$$

$$6\ \overline{)9^31^18}\ = 153$$

Expanded Vertical Method

```
   374
 + 248
 ─────
    12
   110
   500
 ─────
   622
```

Column Method

Once children's mental calculation is secure we move on to teaching vertical column addition. This method starts on the right and works across to the left. Each column is added, when the total is more than ten the ten is carried on.

```
    47
 +  76
 ─────
   123
   1 1
 ─────
```

Decomposition method formal

This is often referred to as column method. As with column addition the child starts on the right, taking the bottom unit away from the top

```
   985
 - 625
   361
```