Addition Progression Map for Written Methods

Children will be taught to identify and use the most efficient method for a calculation.

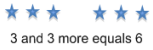
Step 1

- Visual representation, including fingers, bears, cubes, dinosaurs etc
- Maths language - add, more, count on, altogether, equals, the same as
- Sign recognition
- Addition number stories
- Adding objects

6 is 5 and 1 more
6 = 5 and 1

Step 2

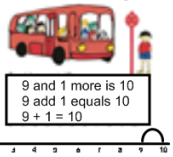
- Concrete method, pictorial
- Practical objects and number lines
- Developing ways of recording calculations
- Maths language - add, more than, plus, jumps forwards, total, altogether



3 and 3 more equals 6

3 + 3 = 6

8 + 2 = 10



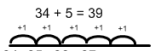
9 and 1 more is 10
9 add 1 equals 10
9 + 1 = 10

Step 3

- Using a number line to add by counting on
- Compensation, eg it is easier when adding 9, to add 10 then subtract 1

Counting on

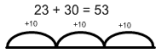
34 + 5 = 39



34 35 36 37 38 39

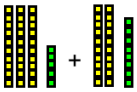
First counting on in ones from a 2 digit number

23 + 30 = 53



23 33 43 53

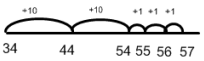
Then counting on in 10s from a 2 digit number



35 + 28 = 63

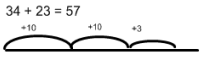
Then adding two 2 digit numbers

34 + 23 = 57



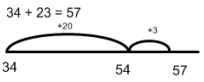
34 44 54 55 56 57

34 + 23 = 57



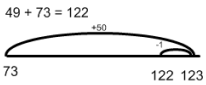
34 44 54 57

34 + 23 = 57



34 54 57

49 + 73 = 122



73 122 123

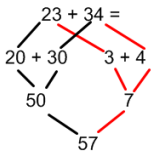
37 + 15 = 52

37 47 50 52

Step 4

- Partitioning

23 + 34 =



20 + 30 3 + 4
50 7
57

23 + 34 = 57
20 + 30 = 50
3 + 4 = 7
50 + 7 = 57

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

80 + 11 = 91

246 + 321 =
200 + 300 = 500
40 + 20 = 60
6 + 1 = 7

500 + 60 + 7 = 567

3562 + 2741 =
3000 + 2000 = 5000
500 + 700 = 1200
60 + 40 = 100
2 + 1 = 3

5000 + 1200 + 100 + 3 = 6303

Step 5

- Column addition

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

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

 587     3587
+ 475    + 675
 1062     4262
 1 1      1 1 1
```

```
  7648      6584
+ 1486    + 5848
  9134     12432
  1 1 1     1 1 1
```

Mathematical vocabulary

add, addition, more than, plus, increase by, make, the sum of, total, partition, altogether, column addition, exchanging, double, near double
one more, two more...ten more...
one hundred more
inverse

Subtraction Progression Map for Written Methods

Subtraction can be seen as taking away or finding the difference by counting on.
Children will be taught to identify and use the most efficient method for a calculation.

Step 1

- Visual representation, including fingers, bears, cubes, dinosaurs etc
- Maths language - subtract, takeaway, less, count back
- Sign recognition
- Subtraction number stories
- Counting on/back using a number line

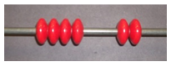
7 is one less than 8.

1 less than 6 is 5.

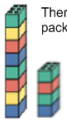
Step 2

- Taking away concrete, pictorial to numerical
- Finding the difference, concrete to pictorial by matching and comparing

7 - 2 = 5



6 - 2 = 4

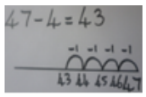


There are 4 more people having packed lunch than school dinner.

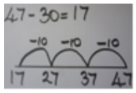
The difference between 8 and 5 is 3

Step 3

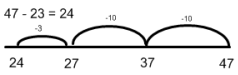
- Using a number line to count back to take away

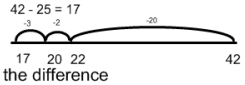


First counting back in ones from a 2 digit number.

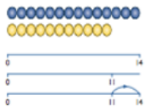


Then counting back in tens from a 2 digit number.

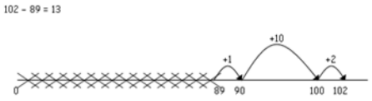




- Using a number line to count on to find the difference



The difference between 11 and 14 is 3.
14 – 11 = 3
11 + □ = 14



Step 4

- Partitioning and decomposition

$$\begin{array}{rcl} 754 & = & 700 + 50 + 4 \\ -286 & & \underline{200 + 80 + 6} \end{array}$$

$$= 700 + 40 + 14$$
$$\underline{200 + 80 + 6}$$

$$= 600 + 140 + 14$$
$$\underline{200 + \ 80 + \ 6}$$
$$\underline{400 + \ 60 + \ 8}$$
$$468$$

$$\begin{array}{rcl} 754 & = & 700 + 50 + 4 \\ -231 & & \underline{200 + 30 + 1} \\ & = & \underline{500 + 20 + 3} \\ & & 523 \end{array}$$

Step 5

- Column method without and then with decomposition

$$\begin{array}{r} 3342 \\ -\ 1221 \\ \hline 2121 \end{array}$$

$$\begin{array}{r} {}^{6}\cancel{7}{}^{14}\cancel{5}^{1}4 \\ -\ 286 \\ \hline 468 \end{array}$$

$$\begin{array}{r} {}^{5}\cancel{6}{}^{13}\cancel{4}^{1}67 \\ -\ 2684 \\ \hline 3783 \end{array}$$

Mathematical vocabulary

take away, count back, subtract, minus, less than, how many are left? the difference between, fewer than, exchanging, borrowing, decrease, half, inverse

Multiplication Progression Map for Written Methods

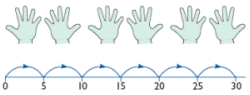
Children will be taught to identify and use the most efficient method for a calculation.

Step 1

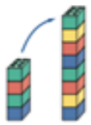
- Visual representation, including fingers, bears, cubes, dinosaurs etc
- Maths language - multiply times lots of
- Sign recognition
- Multiplication number stories
- Groups of objects

Step 2

- Pictorial representations of repeated addition and counting on in steps



5 + 5 + 5 + 5 + 5 + 5 = 30
5 × 6 = 30
5 multiplied by 6
6 groups of 5
6 hops of 5



double 4 is 8
4 x 2 = 8

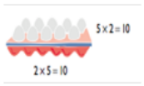
Step 3

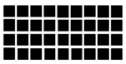
- Using a number line to count/jump on in any given multiple

3 x 5 = 3 + 3 + 3 + 3 + 3

Step 4

- Use of arrays to visually display and represent number relationships



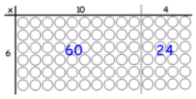


9 x 4 = 36

4 x 9 = 36

Step 5

- Partitioning and the use of the grid method



14 x 6 = (10 x 6) + (4 x 6) = 60 + 24 = 84

372 x 24

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

6000
+ 1400
+ 1200
+ 280
+ 40
+ 8
8928

Step 6

- Formal written methods

$$\begin{array}{r} 72 \\ \times\ 3 \\ \hline 216 \end{array} \qquad \begin{array}{r} 38 \\ \times\ 7 \\ \hline 266 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 742 \\ \times\ 8 \\ \hline 5936 \\ 31 \end{array} \qquad \begin{array}{r} 372 \\ \times 24 \\ \hline 1488 \\ 7440 \\ \hline 8928 \end{array}$$

Mathematical vocabulary

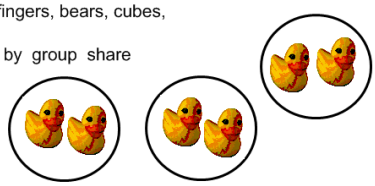
groups, sets of, lots of, double, count in 2s, 5s,10s, repeated addition, array, multiply, scale up, times, multiples, multiplied by, groups of, product, times bigger, times longer, grid method, factor, long multiplication

Division Progression Map for Written Methods

Division can be seen as grouping or sharing equally.
Children will be taught to identify and use the most efficient method for a calculation.

Step 1

- Visual representation, including fingers, bears, cubes, dinosaurs etc
- Maths language - divide divided by group share
- Sign recognition
- Division number stories
- Sharing objects



Step 2

- **Grouping and counting in equal steps:** pictorial leading to concrete
- **Sharing:** pictorial leading to concrete

6 shared between 2

6 ÷ 2 = 3

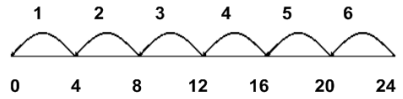
There are 6 sweets, how many people can have 2 sweets each?

Step 3

- Use of the number line

24 ÷ 4 = 6

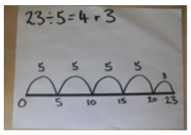
26 divided by 4

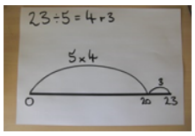


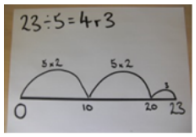
26 ÷ 4 = 6 r 2

Step 4

- Chunking
- Using known multiplications to solve divisions

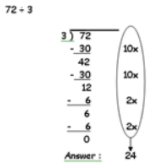


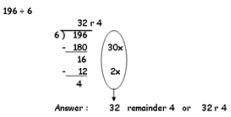




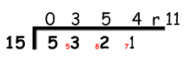
Step 5

- Formal written methods (short and long division)





5321 ÷ 15 = 354 remainder 11



Mathematical vocabulary

share, share equally, one each, two each, three each... group, half, halving, division, divide, divided into, divided by, divisible by, fractions, factor, times smaller, times shorter, chunking, bus stop method, divisor