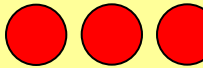
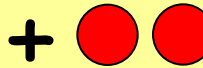
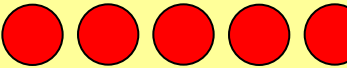


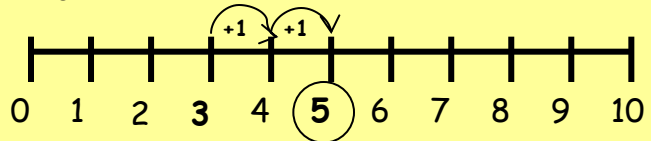
ADDITION +

STAGE 1

Counting everyday objects as often as possible. Counters, pasta pieces or anything else you can find, e.g

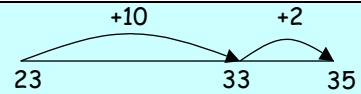
 +  =  $3 + 2 = 5$

Then jumps on a number line, e.g $3 + 2 = 5$

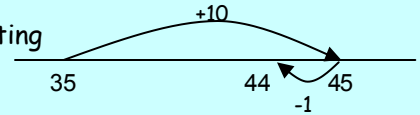


STAGE 2

Jumps on a number line by partitioning a 2 digit number, e.g $23 + 12 = 35$



Adding 9 or 11 using jumps on a number line, then adjusting e.g $35 + 9 = 44$



When children are secure with place value, expanded column method e.g $33 + 6 = 44$

$$\begin{array}{r} 33 \\ + 6 \\ \hline 39 \\ \hline 44 \end{array}$$

Moving on to adding 2 digit numbers, e.g $26 + 32 = 58$

STAGE 3

Expanded column method:

$$83 + 42 = 125$$

$$\begin{array}{r} 83 \\ + 42 \\ \hline 125 \end{array}$$

$$367 + 185 = 552$$

$$\begin{array}{r} 367 \\ + 185 \\ \hline 552 \end{array}$$

STAGE 4

Compact column method for whole numbers.
Expanded column method for decimals.

$$356 + 465 = 821$$

$$\begin{array}{r} 356 \\ + 465 \\ \hline 821 \end{array}$$

$$72.8 + 54.6 = 127.4$$

$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \end{array}$$

STAGE 5

Compact column method. See STAGE 4 guidance for whole numbers. Compact method used with decimals of increasing difficulty, e.g

$$72.8 + 54.6 = 127.4$$

$$\begin{array}{r} 72.8 \\ + 54.6 \\ \hline 127.4 \end{array}$$

then...

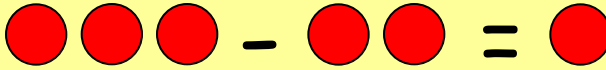
$$13.86 + 9.481 = 23.341$$

$$\begin{array}{r} 13.86 \\ + 9.481 \\ \hline 23.341 \end{array}$$

SUBTRACTION -

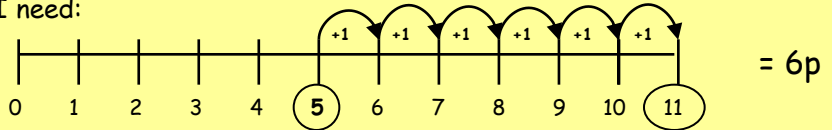
STAGE 1

Taking away everyday objects as often as possible. Counters, pasta pieces or anything else you can find, e.g



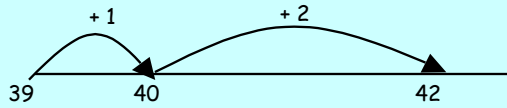
$$3 - 2 = 1$$

Using a number line to find the difference, e.g I have saved 5p the socks I want cost 11p. How much more money do I need:

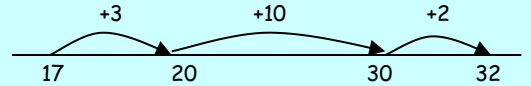
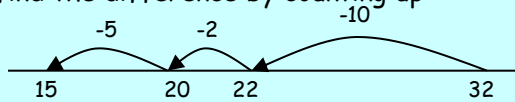


STAGE 2

Using a number line to find a small difference, e.g $42 - 39 = 3$

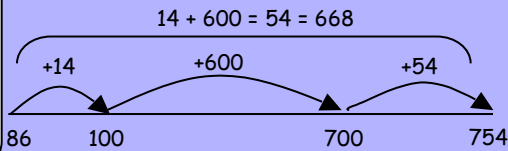


Use a number line and partition numbers to subtract, counting backwards, e.g $32 - 17 = 15$ or find the difference by counting up



STAGE 3

As STAGE 2 but using larger numbers, e.g $754 - 86 = 668$. Children find the difference by counting up. Use find the difference for decimals (see L4 example). At 3b children start to use column method *for whole numbers only* using models to support concept of exchange.



$$\begin{array}{r} 874 \\ - 523 \\ \hline 351 \end{array} \quad \text{then...} \quad \begin{array}{r} 952 \\ - 537 \\ \hline 415 \end{array}$$

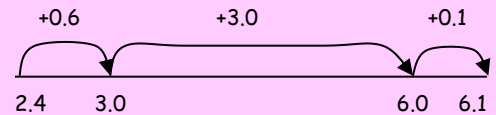
STAGE 4

Columnar for whole numbers. Find the difference for decimals (including numbers with a mixed number of decimal places).

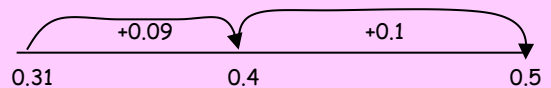
$$932 - 457 = 475$$

$$\begin{array}{r} 8 \quad 12 \quad 1 \\ 932 \\ - 457 \\ \hline 475 \end{array}$$

$$6.1 - 2.4 = 3.7$$



$$0.5 - 0.31 = 0.19$$



STAGE 5

Columnar for whole numbers & decimals.

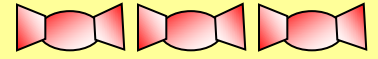
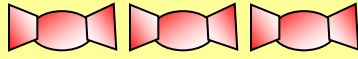
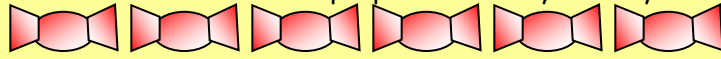
$$2325 - 1568 = 757$$

$$\begin{array}{r} 1 \quad 12 \quad 11 \quad 1 \\ 2325 \\ - 1568 \\ \hline 757 \end{array}$$

DIVISION ÷

STAGE 1

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

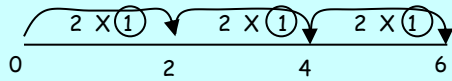


Grouping. Children sort objects into 2s, 3s, 4s, etc. For example, how many pairs of socks are there?

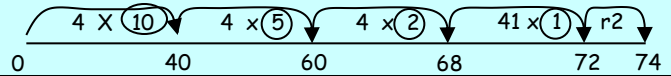


STAGE 2

Grouping / chunking using a number line, e.g $6 \div 2 = 3$



Then grouping / chunking using multiplication facts ($\times 10$, $\times 5$, $\times 2$) with & without remainders.
 $74 \div 4 = 18 \text{ r}2$



STAGE 3

Vertical chunking.

$$222 \div 6 = 37$$

Number facts:

$$6 \times 20 = 120$$

$$6 \times 10 = 60$$

$$6 \times 5 = 30$$

$$6 \times 2 = 12$$

$$\begin{array}{r} 222 \\ - 120 \\ \hline 102 \\ - 60 \\ \hline 42 \\ - 30 \\ \hline 12 \\ - 12 \\ \hline 0 \end{array}$$

$$6 \times 20$$

$$6 \times 10$$

$$6 \times 5$$

$$6 \times 2$$

STAGE 4

When children are secure with the concept of division through chunking, introduce short division. Children should master 1 digit and 2 digit divisors, e.g $496 \div 11$ (see L5 example). Continue to use chunking for decimal division.

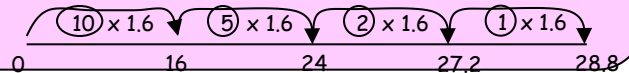
$$98 \div 7 = 14$$

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$$

$$432 \div 5 = 86 \text{ r}2$$

$$\begin{array}{r} 86 \text{ r}2 \\ 5 \overline{) 432} \end{array}$$

$$28.8 \div 1.6 = 18$$



STAGE 5

When children are secure with short division using a 2 digit divisor (see example below), move to long division. Continue to use chunking for decimal division (see STAGE 4 example).

$$496 \div 11 = 45 \text{ r}1$$

$$\begin{array}{r} 45 \text{ r}1 \\ 11 \overline{) 496} \end{array}$$

$$965 \div 5 = 193$$

$$\begin{array}{r} 193 \\ 5 \overline{) 965} \\ - 95 \\ \hline 15 \\ - 15 \\ \hline 0 \end{array}$$

$$432 \div 15 = 28 \text{ r}12$$

$$\begin{array}{r} 28 \text{ r}12 \\ 15 \overline{) 432} \\ - 30 \\ \hline 132 \\ - 120 \\ \hline 12 \end{array}$$



MULTIPLICATION X

STAGE 1

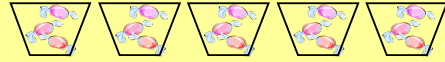
Counting groups of the same size.



Rows: $3 + 3$
3 multiplied by 2
 3×2

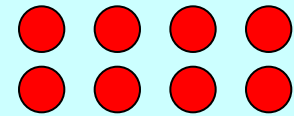
Columns:
 $2 + 2 + 2$
2 multiplied by 3
 $2 \times 3 = 6$

There are 3 sweets in one bag. How many sweets are there in 5 bags? $3 \times 5 = 15$



STAGE 2

Children use arrays and repeated addition:



Rows:
 $4 + 4 = 8$
 $4 \times 2 = 8$

Columns

$2 + 2 + 2 + 2 = 8$ or

$2 \times 4 = 8$

Then move on to the grid method multiplying a 2 digit number, e.g $15 \times 2 = 30$

$$\begin{array}{r|l} \times & 10 & 5 \\ \hline 2 & 20 & 10 \end{array} = 30$$

STAGE 3

Grid method multiplying by a 2 digit number, e.g $72 \times 38 = 2736$. When working out 30×70 encourage children to think in patterns, i.e $3 \times 7 = 21$, $3 \times 70 = 210$, $30 \times 70 = 2100$

$$\begin{array}{r|l} \times & 70 & 2 \\ \hline 30 & 2100 & 60 \\ \hline 8 & 560 & 16 \end{array}$$

Then column method for addition:

$$\begin{array}{r} 2100 \\ 560 \\ 60 \\ 16 \\ \hline 2736 \end{array}$$

STAGE 4

When children are secure with the grid method, short multiplication (i.e multiplying by a single digit) for whole numbers. Continue to use grid method for decimals.

$24 \times 6 = 144$

$$\begin{array}{r} 24 \\ \times 6 \\ \hline 144 \end{array}$$

$342 \times 7 = 2394$

$$\begin{array}{r} 342 \\ \times 7 \\ \hline 2394 \end{array}$$

$7.3 \times 6 = 43.8$

$$\begin{array}{r|l} \times & 7 & 0.3 \\ \hline 6 & 42 & 1.8 \end{array}$$

Encourage pattern spotting with your child, e.g $6 \times 3 = 18$ so $6 \times 0.3 = 1.8$

STAGE 5

Long multiplication (i.e multiplying by more than 1 digit) for whole numbers and decimals.

$124 \times 26 = 3244$

$$\begin{array}{r} & & 1 & 2 & & \\ & & 1 & 2 & 4 & \\ \times & & 2 & 6 & & \\ \hline & 2 & 4 & 8 & 0 & \\ & & 7 & 4 & 4 & \\ \hline & 3 & 2 & 4 & 4 & \\ \hline & 1 & 1 & & & \end{array}$$