
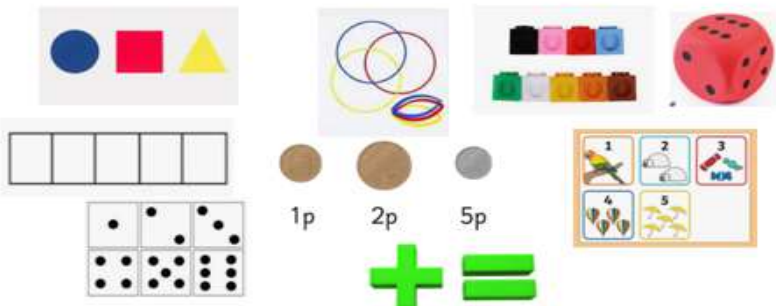

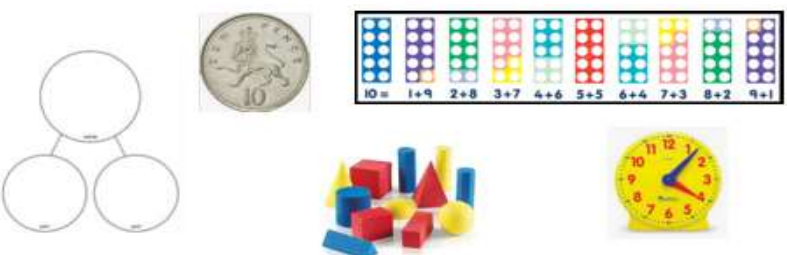




Written and Mental Calculation Policy

May 2022

EYFS – Progression of Resources

	Term 1	Term 2
Autumn		
Spring		
Summer		

Addition

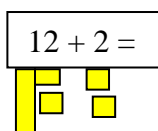
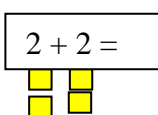
EYFS/Year 1

Children use concrete objects and pictorial representations

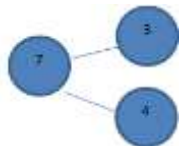


Might be recorded as:
 $2 + 3 = 5$

Begin to use base 10 to represent addition questions



Introduction of bar model and part-part-whole diagrams:



Subtraction

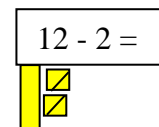
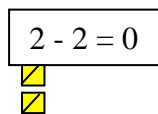
EYFS/Year 1

Children use concrete objects and pictorial representations.

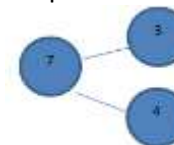
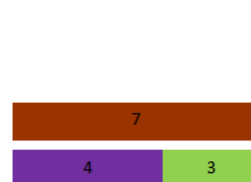


Might be recorded as:
 $5 - 2 = 3$

Begin to use base 10 to represent subtraction questions



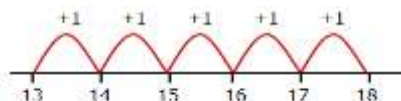
Introduction of bar model and part-part-whole diagrams:



Year 2

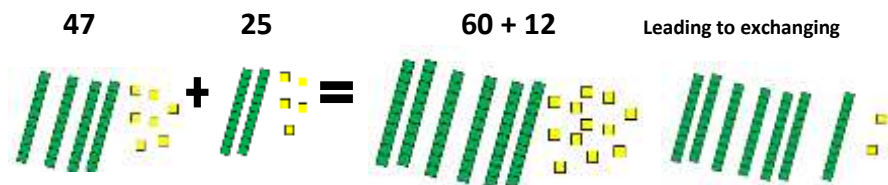
Using number lines to count in ones

$13 + 5 = 18$



Partitioning in different ways and recombine

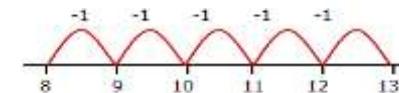
$47 + 25$



Year 2

Using number lines to count back in ones.

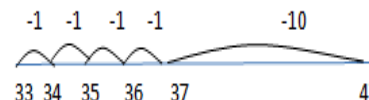
$13 - 5 = 8$



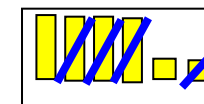
Moving to jumps of 10:

Subtract without exchange / with exchange

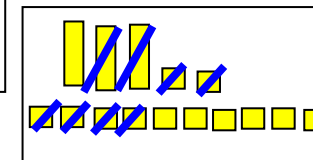
$47 - 33 = 14$



$42 - 31 = 11$



$32 - 16 =$



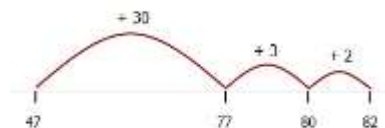
Addition

Year 3

(add numbers with up to 3 digits using formal written methods of column addition)

Use efficient jumps (can also jump 10/1s)

$$47 + 35 = 82$$



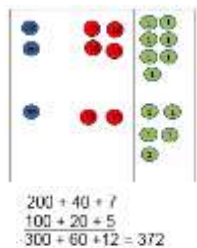
in

Use of bar model to understand structure of addition

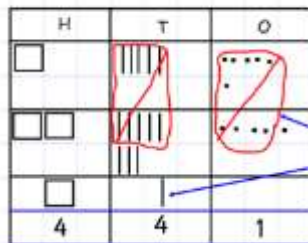


123

Moving towards a method:



$$156 + 285 = 441$$



written

Exchange 10 ones for one 10

	H	T	O
	1	5	6
+	2	8	5
	4	4	1
	↑	↑	

Show exchanging using manipulatives such as base 10 or place value counters. Show pictorially in a place value chart to support addition column method.

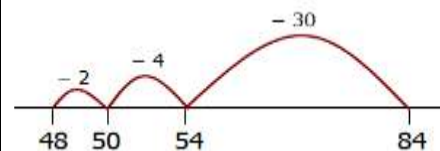
Subtraction

Year 3

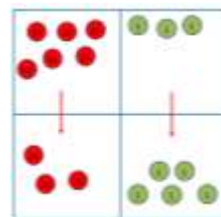
(Subtract numbers with up to 3 digits using formal written methods)

Use efficient jumps (can also jump in 10/1s)

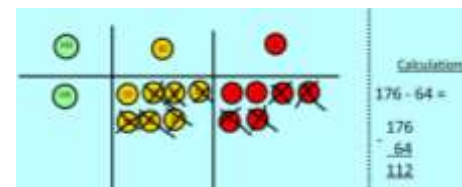
$$\text{Taking away } 84 - 36 = 48$$



Moving towards a written method:



$$\begin{array}{r} 908 \\ - 305 \\ \hline 603 \end{array}$$

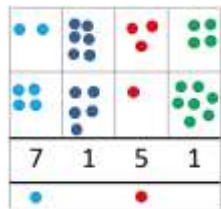


$$463 - 127 = 336$$

	H	T	O
	4	6	3
-	1	2	7
	3	3	6

Year 4

(add numbers with up to 4 digits using formal written methods of column addition where appropriate)



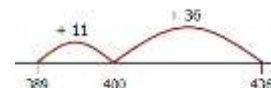
Compact written method:

	Th	H	T	O
	2	4	5	6
+	3	7	2	8
	6	1	8	4
		↑	↑	

Year 4

(Subtract numbers with up to 4 digits using formal written methods of columnar subtraction)

Subtracting by adding (counting up from the smaller number to the larger)
 $436 - 389 = 47$



$7483 - 2736 = 4747$				
Th	H	T	O	
6	7	4	8	3
+	2	7	3	6
	4	7	4	7

Following on from year 3 methods to subtract 4 digit numbers with exchanging.

Addition

Year 5 and Year 6

(add whole numbers with more than 4 digits using formal written methods of column addition. Add decimals including a mix of whole numbers and decimals, decimals with different numbers of decimal places and compliments of 1)

Tth	Th	H	T	O
	2	9	4	5
+	3	4	7	2
	6	4	1	8
		↑	↑	↑

T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
4	2	9	5	6
+	1	3	7	8
	5	6	7	4
		↑	↑	↑

Decimal point to be put in its own square

T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
4	2	9	5	0
+	3	7	8	5
	4	6	7	3
		↑	↑	

Place 0 in decimal columns, to show an understanding of a value of 0 not nothing.

Subtraction

Year 5 and Year 6

(subtract whole numbers with more than 4 digits including using formal written methods. Subtract decimals including a mix of whole numbers and decimals, decimals with different numbers of decimal places)

$78426 - 34752 = 43684$

Tth	Th	H	T	O
7	8	4	2	6
-	3	4	7	5
	4	3	6	8

T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
3	4	2	9	5
-	1	3	7	8
	2	9	1	7

Decimal point to be put in its own square

T	O	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
3	4	2	9	5
	3	7	1	5
	3	9	2	3

Place 0 in decimal columns, to show an understanding of a value of 0 not nothing.

Multiplication

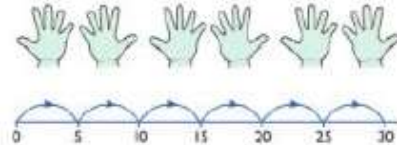
Year 1

Pupils use concrete objects and pictorial representations
How many socks in three pairs?



3 lots of 2

Use of number lines to support counting



Begin to use tens and ones to represent multiplication

$$3 \times 2 =$$



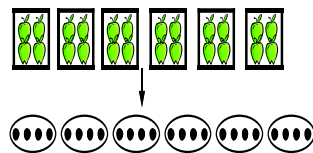
Year 2

Arrays and repeated addition

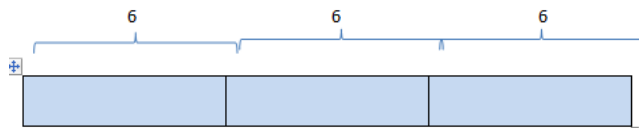
$$6 \times 4 \text{ or } 4 \times 6$$

There are four apples in each box.

How many apples in six boxes?



Include bar models to represent multiplication:

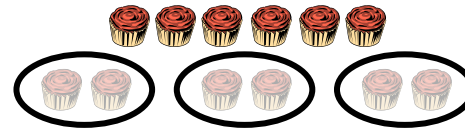


I have 3 packs of 6 eggs. How many eggs altogether.

Division

Year 1

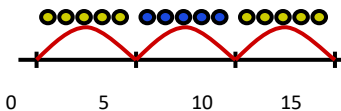
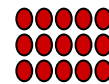
Pupils use concrete objects and pictorial representations to show groupings
6 cakes are shared between 3 people. How many cakes does each person get?



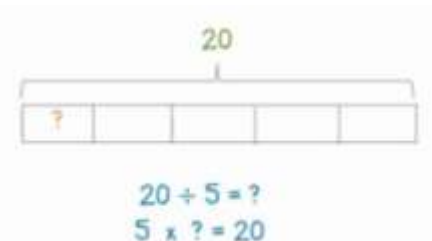
Year 2

Using concrete objects:

$$15 \div 5 = 3$$



How many 5's make 15?



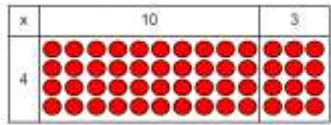
Using the Bar Model to show inverse operation:

Multiplication

Year 3

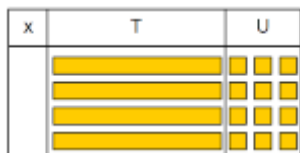
(Write and calculate mathematical statements for multiplication using tables that they know. Develop reliable written methods for multiplication starting by 2 digit by 1 digit. Progression to formal methods of short multiplication)

13×4



4 rows of 10 4 rows of 3

Move towards a more compact method:



4 rows of 13
 13×4
 $10 \times 4 = 30$
 $3 \times 4 = 12$



$21 \times 4 = 84$

$4 \times 1 = 4$
 $4 \times 20 = 80$
 $80 + 4 = 84$

Use a place value chart and manipulatives to model multiplying

Partition into tens and ones then multiply, adding up the products.

Progress to partitioning, using a grid method

$42 \times 3 = 126$

X	40	2
3	120	6

$120 + 6 = 126$

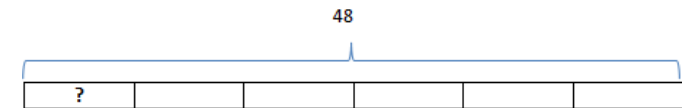
Division

Year 3

(Write and calculate mathematical statements for division using tables that they know. Develop reliable written methods for division starting by 2 digit by 1 digit. Progression to formal methods of short division)

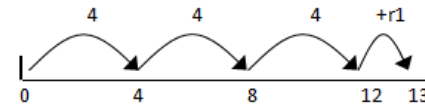
Use a Bar model to show division as breaking into groups:

$48 \div 6 = \square$
 $\square \times 6 = 48$



Children should also move onto calculations involving remainders.

$13 \div 4 = 3 \text{ r } 1$



$69 \div 3 = 23$

Use place value counters and share them equally into a place value chart, which is split into equal groups.



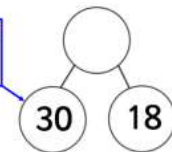
$42 \div 3 =$

Recognise that you need to exchange one 10 for ten 1s



$48 \div 3 = 16$

Use multiple of 10 facts of divisor, e.g. $10 \times 3 = 30$



$30 \div 3 = 10$
 $18 \div 3 = 6$
 $10 + 6 = 16$
 $48 \div 3 = 16$

Multiplication

Year 4

(Multiply 2 and 3 digit numbers by a 1 digit number using formal written layout. Become fluent in using short multiplication)

$245 \times 4 = 980$

	H	T	O	
	●●	●●●●	●●●●●●	x 200 40 5
	●●	●●●●	●●●●●●	4 800 160 20
	●●	●●●●	●●●●●●	800 + 160 + 20 = 980

$\begin{array}{r} 30 + 8 \\ \times \quad 7 \\ \hline 210 \\ \quad 56 \\ \hline 266 \end{array}$	$\begin{array}{r} 38 \\ \times \quad 7 \\ \hline 210 \\ \quad 56 \\ \hline 266 \end{array}$	Moving to: $30 \times 7 = 210$ $8 \times 7 = 56$
---	---	---

Move onto this method as soon as ladder is understood

$$\begin{array}{r} 38 \\ \times \quad 7 \\ \hline 266 \\ 5 \end{array}$$

As soon as possible

Division

Year 4

(Divide 2 and 3 digit numbers by a 1 digit number using formal written layout. Become fluent in using short division)

Multiples of the divisor

$$\begin{array}{l} 98 \div 7 = 14 \\ 10 \times 7 = 70 \\ 4 \times 7 = 28 \end{array}$$

$492 \div 4 =$

H	T	O
●●●●	●●●●	●●●●●●
	●●●●	●●●●●●
	●●●●	●●●●●●
	●●●●	●●●●●●

Exchange one 10 for ten 1s'

$$4 \overline{) 492} \begin{array}{l} 123 \\ \underline{4} \\ 9 \\ \underline{8} \\ 12 \\ \underline{12} \\ 0 \end{array}$$

Multiplication

Year 5

(Multiply numbers up to 4 digits by a 1 digit or 2 digit using formal written method including long multiplication for 2 digit numbers)

Formal method of multiplication

$$\begin{array}{r} 43 \\ \times 6 \\ \hline 18 \quad (3 \times 6) \\ 240 \quad (40 \times 6) \\ \hline 258 \end{array}$$

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

132 x 4 = 3168				
Th	H	T	O	
	1	3	2	
x	2	4		
	5	2	8	(132 x 4)
+ 2	6	4	0	(132 x 20)
	3	1	6	8

Place a 0 in the ones column to show multiplying by 10 (10 times bigger)

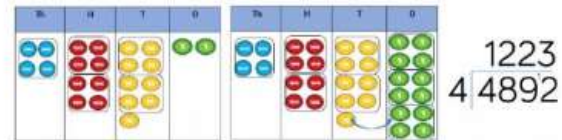
Division

Year 5

(Divide numbers up to 4 digits by 1 digit using formal method of short division and interpret remainders appropriately for the context)

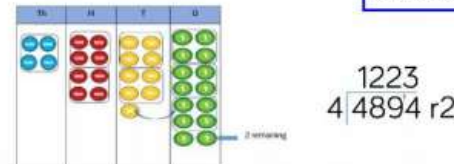
Use place value counters and a place value chart to support understanding of the short division method where needed.

$$4892 \div 4 = 1223$$



$$4894 \div 4 = 1223$$

Dividing with remainders



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

(estimate: $400 \div 5 = 80$)

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

Divide numbers up to 4 digits and decimals with 2 decimal places.

Multiplication

Year 6

(Multiply numbers up to 4 digits by a 2 digit number using formal written method. Multiply 1 digit numbers with up to 2 decimal places by whole numbers)

	Th	H	T	O
		1	3	2
x			2	4
		5	2	8
+ 2		6	4	0
	3	1	6	8

Decimal point to be put in its' own square

T	O	•	$\frac{1}{10}$	$\frac{1}{100}$
3	4	•	2	6
<hr/>				
2	0	5	•	5
				6
				6

2 1 3

Division

Year 6

(Divide numbers up to 4 digits by 2 digit using formal method of long division and interpret remainders appropriately for the context, as fractions or by rounding. Divide decimals by 1 digit whole number, initially in practical contexts involving measure and money)

$3744 \div 16 = 234$

2	3	4	
16	3	7	4
	-	3	2
		5	4
		-	4
		6	4
		-	6
		0	0

remainders can be shown as decimal or a quotient

$637 \div 4 = 159 \frac{1}{4}$

1	5	9	•	1
6	3	7	•	0

Write the remainder over the divisor to form a fraction remainder

$637 \div 4 = 159.25$

1	5	9	•	2	5
4	6	3	7	•	0

Place the remainder into the tenths column. Continue this into the next decimal place value (maximum of 3 decimal places)

Put the decimal point into the calculation and answer.

Multiples to Help

- 2 x 16 = 32
- 3 x 16 = 48
- 4 x 16 = 64
- 5 x 16 = 80

$826.4 \div 5 = 165.28$

1	6	5	•	2	8
5	8	2	6	•	4

Continue remainders into the next decimal place column (maximum of 3 decimal places).

Decimal point to be put in its' own square