

Addition Progression

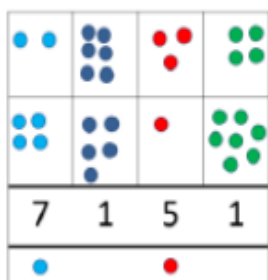
Year Three

Columnar addition up to 3-digits

Compact Vertical Method with regrouping in ones and tens column

$$\begin{array}{r} 374 \\ + 248 \\ \hline 622 \\ \hline 11 \end{array}$$

Children can draw a pictorial representation of the columns and place value counters to further support their learning and understanding.



Year Four

Columnar addition up to 4-digits

Compact Vertical Method with regrouping in multiple columns

$$\begin{array}{r} 2370 \\ + 4856 \\ \hline 7226 \\ \hline 11 \end{array} \quad \begin{array}{r} £13.78 \\ + £12.45 \\ \hline £26.23 \\ \hline 11 \end{array}$$

As children move on to decimals, money and decimal place value counters can be used to support learning.

Year Five

Columnar addition of numbers with more than 4-digits

Compact Vertical Method with regrouping in multiple columns

$$\begin{array}{r} 3.243 \\ + 18.070 \\ \hline 21.313 \\ \hline 11 \end{array}$$

Year Six

Columnar addition for any number of digits or any number (including decimals)

Accuracy required and independent self-checking used

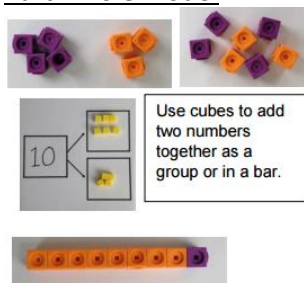
$$\begin{array}{r} 12345 \\ 3458 \\ + 34765 \\ \hline 50568 \\ \hline 1111 \end{array}$$

Missing number calculations given to consolidate and challenge

$$\begin{array}{r} 89563 \\ + 4\boxed{}5\boxed{}9 \\ \hline \boxed{}\boxed{}3\boxed{}22 \end{array}$$

Additional Support

Part-whole model



Counting on from larger number

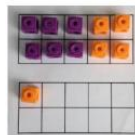


Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.

Regrouping to make 10



$$6 + 5 = 11$$

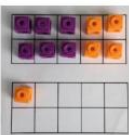


Start with the bigger number and use the smaller number to make 10.

Adding three single digits



$$6 + 5 = 11$$

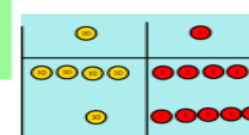
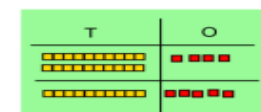


Start with the bigger number and use the smaller number to make 10.

Column method – no regrouping

$$24 + 15 =$$

Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.



Subtraction Progression

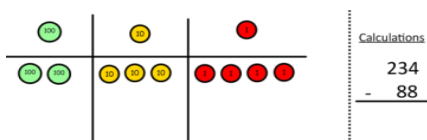
Year Three

Columnar subtraction up to 3-digits

Decomposition (compact method)
Regrouping required in multiple columns

$$\begin{array}{r} 6 \text{ } 13 \text{ } 11 \\ 741 \\ - 367 \\ \hline 374 \end{array}$$

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving on to subtractions with 2 or more exchanges.



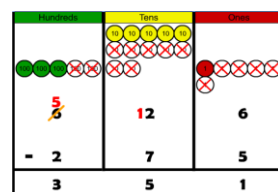
Year Four

Columnar subtraction up to 4-digits

Decomposition (compact method)
Regrouping required in multiple columns

$$\begin{array}{r} 6 \text{ } 9 \text{ } 15 \text{ } 14 \\ 70154 \\ - 489 \\ \hline 6575 \end{array}$$

Draw counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges made.



Columnar subtraction for numbers with 2 decimal places with exchanging required

$$\begin{array}{r} 5.63 \\ - 2.07 \\ \hline 3.56 \end{array}$$

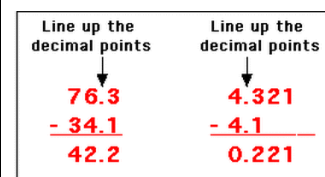
Year Five

Columnar subtraction of numbers with more than 4-digits

Decomposition (compact method)
Regrouping required in multiple columns

$$\begin{array}{r} 7 \text{ } 9 \text{ } 9 \text{ } 1 \\ 8000 - \\ 673 \\ \hline 7327 \end{array}$$

Columnar subtraction for numbers with 1, 2, or 3 decimal places when regrouping is required

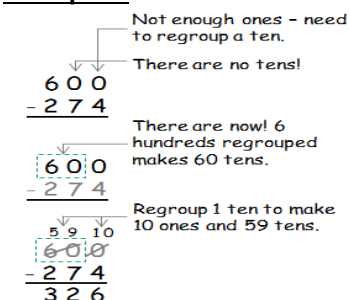


Year Six

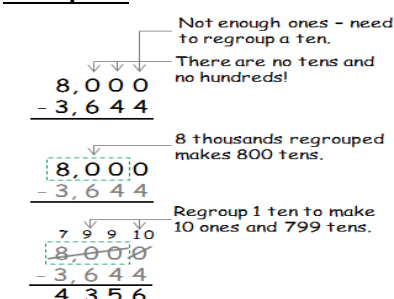
Columnar subtraction for any number of digits (including 3 decimal places) with increased accuracy and explanation

Decomposition (compact method)
Regrouping required in multiple columns

Example 1



Example 2

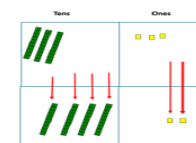
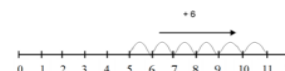


Additional Support

Count back on a number line or number track. This can progress all the way to counting back using two 2-digit numbers.



Count on to find the difference



Use Base 10 to show how you partition numbers to subtract with no regrouping.

Multiplication Progression

Year Three

Distributive Law to multiply a 1-digit number by a 2-digit number

$$\begin{aligned} 13 \times 4 &= 52 \\ 3 \times 4 &= 12 \\ 10 \times 4 &= 40 \end{aligned}$$

Expanded vertical method to consolidate understanding of place value

$$\begin{array}{r} 13 \\ \times 4 \\ \hline 12 \leftarrow 3 \times 4 \\ 40 \leftarrow 10 \times 4 \\ \hline 52 \end{array}$$

Leading to short method with regrouping in ones and tens column

$$\begin{array}{r} 43 \\ \times 6 \\ \hline 258 \\ \hline 1 \end{array}$$

Year Four

Formal written method to multiply 3-digits by 1-digit

	H	T	U	
	4	6	3	
x			8	
	3	7	0	4
	5	2		

← Answer line

Year Five

Formal written method to multiply a whole number by a decimal

$$23.4 \times 5 =$$

$$\begin{array}{r} 23.4 \\ \times 5 \\ \hline 117.0 \\ \hline 2 \end{array}$$

Long multiplication to multiply up to 4-digits with 1 or 2-digits

$$\begin{array}{r} 521 \times \\ 22 \\ \hline 1042 \\ 10420 \\ \hline 11462 \end{array}$$

Multiply two decimal numbers using a formal written method

Multiplying Decimals

1. Multiply like whole numbers.
2. Count decimal places in the problem.
3. Put the same number of places behind the decimal in the product.

$$\begin{array}{r} 2.34 \\ \times 1.2 \\ \hline 2.808 \end{array}$$

2 decimal places
+ 1 decimal place
3 decimal places

Year Six

Formal written method using long multiplication to multiply 4-digits by 2-digits

$$256 \times 18$$

(estimate $250 \times 20 = 5000$)

$$\begin{array}{r} 256 \\ \times 18 \\ \hline 2048 \\ 2560 \\ \hline 4608 \end{array}$$

Answer: $256 \times 18 = 4608$

Additional Support

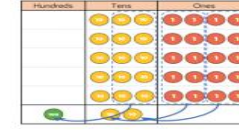
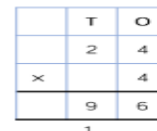
Arrays showing commutative multiplication



Repeated addition



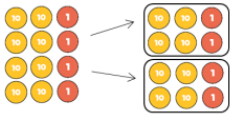
Column multiplication can continue to be supported by place value counters and Base 10



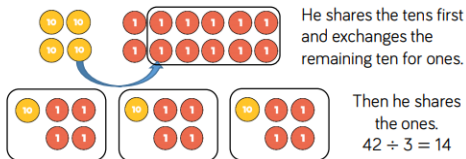
Division Progression

Year Three

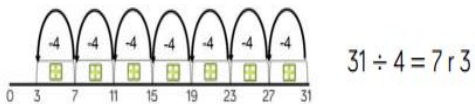
Use partitioning to divide by a single digit number dividing quantities into equal group



Use partitioning to divide numbers that involve exchanging between tens and ones with no remainders.



Division with remainders making links with repeated subtraction and clear notation



Year Four

Formal method of short division to divide up to 3-digits by 1-digit including remainders

$8 \overline{) 16}$
 $9 \div 8 = 1 \text{ r } 1$ (carry the remainder into the next column)
 $16 \div 8 = 2$

$$\begin{array}{r} 218 \\ 4 \overline{) 872} \\ \underline{8} \\ 7 \\ \underline{7} \\ 2 \\ \underline{2} \\ 0 \end{array}$$

Year Five

Formal method of short division to divide up to 4-digits by 1-digit including remainders

$$\begin{array}{r} 4 \ 6 \ 4 \\ 7 \overline{) 3 \ 2 \ 4 \ 8} \end{array}$$

Short division with remainders as fractions

496 $\div$ 11 becomes

			4	5	r1
				5	
1	1	4	9	6	

Answer: $45\frac{1}{11}$

Short division with remainders as decimals

$$\begin{array}{r} 078.33 \\ 3 \overline{) 2^2 3^2 5.^1 0^1 0} \end{array}$$

Year Six

Formal method of long division up to 4-digits by 2-digits including remainders

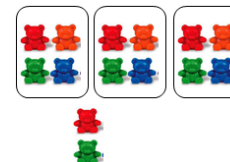
$$\begin{array}{r} 0175 \text{ r } 11 \\ 14 \overline{) 2461} \\ \underline{14} \\ 106 \\ \underline{98} \\ 81 \\ \underline{70} \\ 11 \end{array}$$

Additional Support

Division as grouping using cubes, counters, objects or place value counters to aid understanding. Division with a remainder

Bar models used to split the number

$$96 \div 3 = 32$$



Use bar models to split into the number of groups you are dividing by and work out how many would be within each group.

