

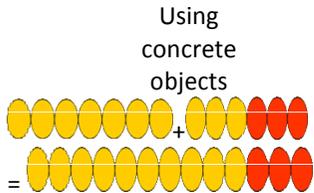
St Helen's progression in written calculation strategies for **addition**

Year 1

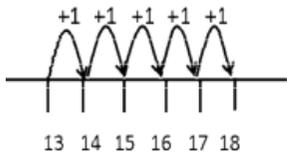
Add one-digit and two-digit numbers to 20, including zero. Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems.

Possible representations

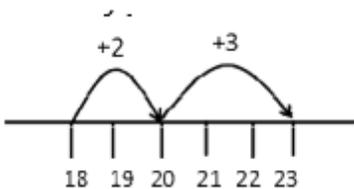
e.g. $7 + 6 =$



Using pictorial representations
e.g. $13 + 5 =$



Addition using more efficient jumps to the next multiple of 10
e.g. $18 + 5 =$



Year 2

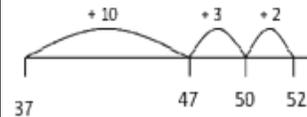
Solve problems with addition:
-using concrete objects and pictorial representations, including those involving numbers, quantities and measures
-applying their increasing knowledge of mental and written methods.

Add numbers using concrete objects, pictorial representations and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers

2 digit number add a 2 digit number using efficient place value jumps

e.g. $37 + 15 =$



$34 + 23 =$

$$\begin{array}{r} 34 \quad 30 \quad 4 \\ +23 \quad 20 \quad 3 \\ \hline 50 \quad 7 = 57 \end{array}$$

Only move children onto the column method once they are secure with place value

Year 3

Add numbers with up to three digits, using formal written methods of columnar addition.

Solve problems, including missing number problems, using number facts, place value, and more complex addition.

e.g. $376 + 57 =$

$$\begin{array}{r} 376 \quad 300 \quad 70 \quad 6 \\ + 57 \quad \quad \quad 50 \quad 7 \\ \hline 300 \quad 120 \quad 13 = 433 \end{array}$$

Year 4

Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate

e.g. $6321 + 858 =$

$$\begin{array}{r} 6321 \\ + 858 \\ \hline 7179 \\ 1 \end{array}$$

Measurement

Based on statutory guidance linked to money and measures to 2 decimal places. Introduce decimal addition on a number line first, so that they understand place value.

e.g. $67.75 + 21.50 =$

$$\begin{array}{r} 67.75 \\ + 21.50 \\ \hline 89.25 \\ 1 \end{array}$$

Year 5

Add whole numbers with more than 4 digits, including using formal written methods (columnar addition)

e.g. $12478 + 73649 =$

$$\begin{array}{r} 12478 \\ + 73649 \\ \hline 86127 \\ 1 \quad 1 \quad 1 \end{array}$$

Measurement

Based on statutory guidance linked to money and measures to 3 decimal places.

$$\begin{array}{r} 9.423 \\ + 6.782 \\ \hline 16.205 \\ 1 \quad 1 \end{array}$$

Year 6

Solve addition multi-step problems in context, deciding which operations and methods to use and why

Measurement

Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate

St Helen's progression in written calculation strategies for **subtraction**

Year 1

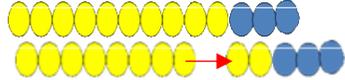
Subtract one-digit and two-digit numbers to 20, including zero.

Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as:
 $9 - \square = 7$

Possible representations

Using concrete objects

e.g. $13 - 5 =$



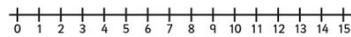
Using pictorial representations



Use the number line to jump **back**

Subtracting using more efficient jumps

e.g. $15 - 8$



Year 2

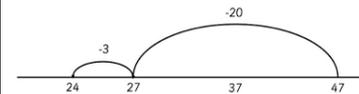
Subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers

Possible representations

2 digit subtract 2 digit using efficient place value jumps

$$47 - 23 =$$



Use the number line to jump **back**

Moving on to expanded decomposition with no exchanges
 e.g. $98 - 54$

$$\begin{array}{r} 98 \quad 90 \quad 8 \\ - 54 \quad 50 \quad 4 \\ \hline 40 \quad 4 = 44 \end{array}$$

Year 3

Subtract numbers with up to three digits, using formal written methods of columnar subtraction with exchanges

e.g. $756 - 84 =$

$$\begin{array}{r} 756 \quad \overset{600}{700} \quad \overset{150}{50} \quad 6 \\ - 84 \quad \quad \quad 80 \quad 4 \\ \hline 600 \quad 70 \quad 2 = 672 \end{array}$$

Year 4

Subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate
 e.g. $8417 - 3908 =$

$$\begin{array}{r} \overset{7}{8} \overset{1}{4} \overset{0}{1} \overset{1}{7} \\ - 3908 \\ \hline 4509 \end{array}$$

Linked to money and measures (2 decimal places).

Initially introduce decimal subtraction on a number line, to ensure they understand place value.

$$\begin{array}{r} \overset{5}{6} \overset{1}{7} . 75 \\ - 28.50 \\ \hline 39.25 \end{array}$$

Year 5

Subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
 e.g. $12407 - 9614 =$

$$\begin{array}{r} \overset{0}{1} \overset{11}{2} \overset{13}{4} \overset{1}{0} \overset{1}{7} \\ - 9614 \\ \hline 2793 \end{array}$$

Measurement

Solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

$$\begin{array}{r} \overset{8}{9} \overset{13}{.4} \overset{1}{2} \\ - 6.78 \\ \hline 2.64 \end{array}$$

Year 6

Solve subtraction multi-step problems in context, deciding which operations and methods to use and why.

Measurement Solve problems involving the calculation and conversion of units of measure, using decimal notation up to 3 decimal places where appropriate.

St Helen's progression in written calculation strategies for multiplication

Year 1

Solve one-step problems involving multiplication by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

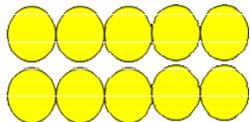
Possible representations

e.g. $2 \times 3 =$

There are two bowls with three apples in each. How many apples are there altogether?



They make connections between arrays, number patterns, and counting in twos, fives and tens.

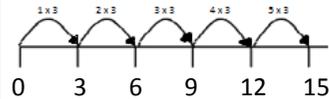


Year 2

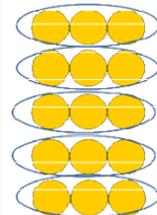
Solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in context.

Possible representations

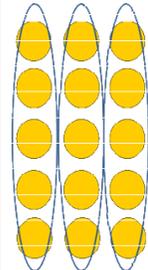
e.g. $5 \times 3 =$



$5 \times 3 =$



$3 \times 5 =$



Multiplication facts include:
2,5 and 10

Year 3

Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

e.g. $34 \times 8 =$

x	30	4	
8	240	32	= 272

Multiplication facts include:
2,3,4,5,8 and 10

If children are secure with grid method, they can move onto the short multiplication method.

TU X U

$$\begin{array}{r} 34 \\ \times 8 \\ \hline 32 \text{ (8 x 4)} \\ \underline{240} \text{ (8 x 30)} \\ 272 \end{array}$$

Year 4

Introduce with the grid method. Multiply two-digit and three-digit numbers by a one digit number using the formal written layout.

TU x U

e.g. 28×9

$$\begin{array}{r} 28 \\ \times 9 \\ \hline 72 \text{ (9x8)} \\ \underline{180} \text{ (9x20)} \\ 252 \end{array}$$

HTU x U

e.g. $347 \times 7 =$

$$\begin{array}{r} 347 \\ \times 7 \\ \hline 2429 \end{array}$$

Multiplication facts up to
 12×12

Year 5

Multiply numbers up to 4 digits by a one or two digit number using the formal written method,

e.g. $2741 \times 6 =$

$$\begin{array}{r} 2741 \\ \times 6 \\ \hline 16446 \end{array}$$

Including long multiplication for two-digit numbers

$$\begin{array}{r} 24 \\ \times 16 \\ \hline 144 \\ \underline{240} \\ 384 \end{array}$$

Year 6

Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. e.g. $2741 \times 66 =$

$$\begin{array}{r} 2741 \\ \times 66 \\ \hline 16446 \\ \underline{164460} \\ 180906 \end{array}$$

Multiply one-digit numbers with up to 2 decimal places by whole numbers

$$\begin{array}{r} 2.41 \\ \times 6 \\ \hline 14.46 \end{array}$$

St Helen's progression in written calculation strategies for division

Year 1

Solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Possible representations

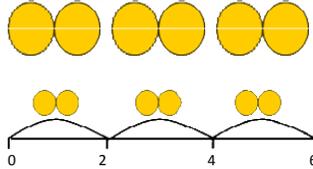
Sharing:

e.g. $6 \div 3 =$

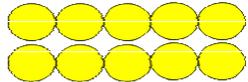
How many apples are in each bowl if I share 6 apples between three bowls?



Grouping:



They make connections between arrays, number patterns, and counting in twos, fives and tens.



(With support of the teacher)

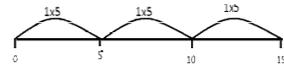
Year 2

Solve problems involving division, using materials, arrays, repeated addition, mental methods, and division facts, including problems in contexts.

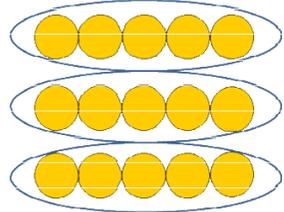
Possible representations

e.g. $15 \div 5 =$

Counting up on a number line.



Using arrays



Division facts: 2,5 & 10

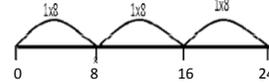
They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes.

Year 3

Write and calculate mathematical statements for division using the multiplication tables that they know, progressing to formal written methods.

e.g. $24 \div 8 =$

Counting up on a number line.



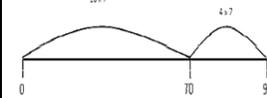
Division facts include: 2,3,4,5,8 and 10

Year 4

Continue to write and calculate mathematical statements for division using the multiplication tables that they know, progressing to formal written methods.

e.g. $98 \div 7 =$

Counting up on a number line



Pupils practise to become fluent in the formal written method of short division with exact answers

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

Division facts up to 12 x 12

Year 5

Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.

Divide whole numbers and those involving decimals by 10, 100 and 1000

e.g. $8369 \div 8 =$

$$\begin{array}{r} 1046 \text{ r } 1 \\ 8 \overline{)8369} \end{array}$$

Interpret non integer answers to division by expressing results in different ways
e.g.

$$98 \div 4 = \frac{98}{4} = 24\text{r}2 = 24\frac{1}{2} = 24.5$$

Year 6

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.

Chunking e.g. $480 \div 12 =$

$$\begin{array}{r} 40 \\ 12 \overline{)480} \\ \underline{240} \quad (20 \times 12) \\ \underline{240} \quad (20 \times 12) \\ 0 \end{array}$$

Long division: $432 \div 15 =$

$$\begin{array}{r} 28.8 \\ 15 \overline{)432.0} \\ \underline{30} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

Short division: $496 \div 11 =$

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

