

Year 3 - Maths

Number - Number and Place Value

Pupils should be taught to:

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.

Number - Addition and Subtraction

Pupils should be taught to:

- add and subtract numbers mentally, including:
 - a three-digit number and ones
 - a three-digit number and tens
 - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Number – Multiplication and Division

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Number – Fractions

Pupils should be taught to:

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

Measurement

Pupils should be taught to:

- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

Geometry – Properties of shapes

Pupils should be taught to:

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Statistics

Pupils should be taught to:

- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables

Note: Please see appendices for Year 3 Termly Instant Recall Facts

Year 3 Calculations

Addition

Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 3:

- Number bonds for all numbers to 20

Missing number problems using a range of equations as in Year 1 and 2 but with appropriate, larger numbers.

Partition into hundreds, tens and ones

Partition both numbers and recombine.

Count on by partitioning the second number only e.g.

$$\begin{aligned}247 + 125 &= 247 + 100 + 20 + 5 \\ &= 347 + 20 + 5 \\ &= 367 + 5 \\ &= 372\end{aligned}$$

Children need to be secure adding multiples of 100 and 10 to any three digit number including those that are not multiples of 10.

Towards a written method

(These notes are to aid explaining this method-children should not necessarily be expected to record this method- could use informal jottings to support mental calculations.)

See Year 2 ~ children need to be secure with partitioning and recombining to find a total. This method can then lead to a more **compact method**. Continue to work on this expanded method of column addition modelled with place value counters (diennes could be used for those who need a more concrete representation).

e.g. $436 + 252$ Partition the numbers:

	H	T	U
	400	+ 30	+ 6
+	200	+ 50	+ 2
	<hr/>		
	600	+ 80	+ 8 = 688

Where the numbers to be totalled are too difficult to add mentally, an additional calculation can be made:

e.g. $458 + 387$ Partition the numbers: H T U

$$\begin{array}{r}
 400 + 50 + 8 \\
 + 300 + 80 + 7 \\
 \hline
 700 + 130 + 15
 \end{array}$$

To find the total, partition the numbers:

$$\begin{array}{r}
 \text{H} \quad \text{T} \quad \text{U} \\
 700 + 0 + 0 \\
 100 + 30 + 0 \\
 + \quad \quad \underline{10 + 5} \\
 \hline
 800 + 40 + 5 = 845
 \end{array}$$

Vertical Addition (carrying)

Set out all column addition on squared paper, to support understanding of place value.

Vertical addition (carrying) is only used when a child has a very sound understanding of the mathematics involved in the previous methods.

- a) $\begin{array}{r} 625 \\ + 48 \\ \hline \quad 3 \\ \quad \quad 1 \end{array}$ add the units,
 five add eight is thirteen
 one ten under the tens column and
 3 in the units column.
- b) $\begin{array}{r} 625 \\ + 48 \\ \hline \quad 73 \\ \quad \quad 1 \end{array}$ add the tens, twenty add forty is
 sixty, plus ten underneath, seventy.
 put the seventy in the tens column.
- c) $\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ \quad \quad 1 \end{array}$ add the hundreds, six hundreds.
 put the six hundreds in the hundreds
 column.

This is how the calculation would look in a child's book:

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$$

This carrying method can also be used with larger numbers:

$$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 11 \end{array}$$

This formal written method of addition, including carrying should be used by children when they are secure in steps towards written method.

Year 3 Calculations

Subtraction

Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 3:

- Number bonds for all numbers to 20

Missing number problems e.g.

$$\blacksquare = 43 - 27 \quad 145 - \blacksquare = 138 \quad 274 - 30 = \blacksquare \quad 245 - \blacksquare = 195$$

$$532 - 200 = \blacksquare \quad 364 - 153 = \blacksquare$$

Mental methods should continue to develop, supported by a range of models and images, including the number line. Children should make choices about whether to use complementary subtraction or counting back, depending on the numbers involved.

Written methods (progressing to 3 digit numbers)

Introduce expanded column subtraction with no decomposition, modelled with place value counters (dienes could be used for those who need more concrete representation).

$$98 - 35 = 63$$
$$\begin{array}{r} 908 \\ - 305 \\ \hline 603 \end{array}$$

For some children this will lead to exchanging, modelled using place value counters (or dienes).

Exchanging

Beginning to introduce decomposition.

Set this method out on squared paper.

Subtracting a number where the units digit to be subtracted, is bigger than the other units digit so 1 ten has to be **exchanged** for 10 units. At this stage the calculation needs to be written in vertically. Some children may begin to use a

formal columnar algorithm, initially introduced alongside the expanded method. The formal method should be seen as a more streamlined version of the expanded method, not a new method.

$$\begin{array}{r}
 \text{T U} \\
 3 \quad 1 \\
 \cancel{4} \quad 5 \\
 \underline{-2 \quad 9} \\
 \underline{1 \quad 6}
 \end{array}$$

Initially use examples where units number is too big, therefore decomposition is from 10s column.

*We say: 5 take away 9 we can't do
change 1 ten into units
add to the units column which now equals 15
the tens column is now 30
15 take away 9 equals 6
3 tens take away 2 tens equals 10
1 ten add 6 equals 16*

$$\begin{array}{r}
 \text{H T U} \\
 \quad 2 \quad 1 \\
 \quad 1 \quad \cancel{3} \quad 2 \\
 - \quad \underline{- 2 \quad 7} \\
 \underline{1 \quad 0 \quad 5}
 \end{array}$$

Move onto 3 digit numbers (decomposition still in 10s column).

Both of these methods need to be supported practically to introduce exchanging tens into units, using base ten apparatus such as Dienes rods and cubes or 10p and 1p coins.

Year 3 Calculations

Multiplication

Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 3:

- Multiplication facts for 3x, 4x and 8x tables.

Missing number problems

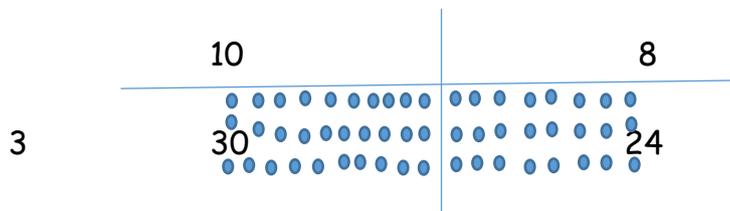
Continue with a range of equations as in Year 2 but with appropriate numbers.

Mental methods

- Doubling 2 digit numbers using partitioning.
- Demonstrating multiplication on a number line - jumping in larger groups.
- $13 \times 4 = 10$ groups of 4 + 3 groups of 4

Towards written methods (progressing to 2 digit \times 1 digit)

- Develop written methods using understanding of visual images.



$$18 \times 3$$

Use knowledge of place value to explain that 18×3 is the same as 10×3 and 8×3 .

Begin to use written method to multiply two digit by one digit number. At first use expanded brackets method. When secure move to short method.

$$\begin{array}{r} 27 \\ \times 7 \\ \hline 49 \text{ (7} \times \text{7)} \\ + 140 \text{ (7} \times \text{20)} \\ \hline 189 \end{array}$$

Year 3 Calculations

Division

Key Instant Recall Facts

In preparation for secure methods of calculation, children will develop instant recall of the following facts during Year 3:

- Division facts $\div 3$, $\div 4$, $\div 18$

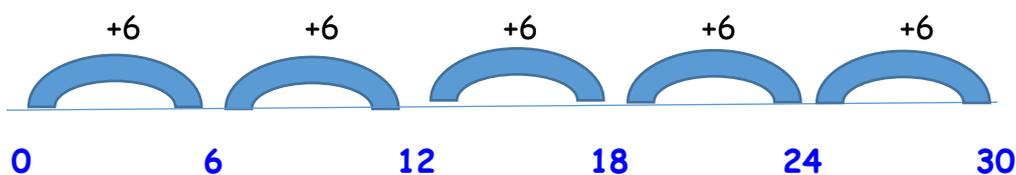
\div = signs and missing numbers

Continue using a range of equations as in Year 2 but with appropriate numbers.

Grouping

How many 6's are in 30?

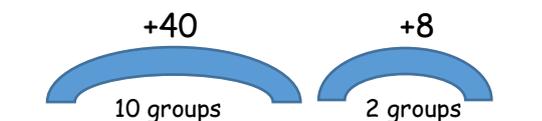
$30 \div 6$ can be modelled as:



Becoming more efficient using a numberline

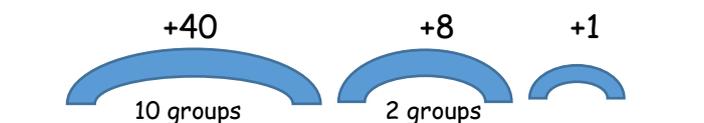
Children need to be able to partition the dividend in different ways.

$$48 \div 4 =$$



Remainders

$$49 \div 4 = 12 \text{ r}1$$



Sharing ~ 49 shared between 4. How many left over?

Grouping ~ How many 4s make 49? How many are left over?

Place value counters can be used to support children apply their knowledge of grouping.

For example: $60 \div 10 =$ How many groups of 10 in 60?

$600 \div 100 =$ How many groups of 100 in 600