

**End of Year Objective:**

**Add whole numbers with more than 4 digits *and* decimals with two decimal places, including formal written methods (columnar addition).**

Children should continue to use the carrying method to solve calculations such as:

$$\begin{array}{r}
 3364 \\
 + 247 \\
 \hline
 3611 \\
 \hline
 11
 \end{array}$$

$$\begin{array}{r}
 3121 \\
 \phantom{00}37 \\
 + \phantom{00}148 \\
 \hline
 3306 \\
 \hline
 11
 \end{array}$$

$$\begin{array}{r}
 3.56 \\
 + 2.47 \\
 \hline
 6.03 \\
 \hline
 1
 \end{array}$$

They will also be adding:

- several numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with each number having the same number of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another

**End of Year Objective:**

**Subtract whole numbers with more than 4 digits *and* decimals with two decimal places, including formal written methods (columnar subtraction).**

Children should continue to use the decomposition method to solve calculations such as:

$$\begin{array}{r}
 \begin{array}{cc} \cancel{6} & \cancel{6} \\ 7 & 10 \end{array} & \begin{array}{cc} 7 & 12 \\ - & 3 \end{array} \\
 \hline
 3 & 8 & 4 & 6 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \begin{array}{cc} \cancel{2} & \cancel{13} \\ 3 & . & 4 & 12 \\ - & 1 & . & 7 & 6 \\ \hline
 1 & . & 6 & 6 \\ \hline
 \end{array}
 \end{array}$$

They will also be subtracting:

- numbers with different numbers of digits, understanding the place value;
- *decimals with up to two decimal places (with each number having the same number of decimal places), knowing that the decimal points line up under one another.*
- amounts of money and measures, including those where they have to initially convert from one unit to another

**End of Year Objective:**

**Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.**

Children should continue to use the grid method and extend it to multiplying numbers with up to four digits by a single digit number, e.g.

$4346 \times 8$

x	4 000	300	40	6	
8	32 000	2400	320	48	32000 + 2400 + 320 + 48 <hr style="width: 100%;"/> 34768 <hr style="width: 100%;"/>

and numbers with up to four digits by a two-digit number, e.g.

$2693 \times 24$

x	2000	600	90	3	
20	40000	12000	1800	60	40000 + 8000 + 12000



Children should also be using this method to solve problems and multiply numbers in the context of money or measures.

During Year 5, the transition from the grid method into the formal vertical method for multiplication should take place. The traditional vertical compact method of written multiplication is a highly efficient way to calculate, but it has a very condensed form and needs to be introduced carefully.

It is most effective to begin with the grid method, moving to an expanded vertical layout, before introducing the compact form. This allows children to see, and understand, how the processes relate to each other and where the individual multiplication answers come from e.g.

$$368 \times 6$$

x	300	60	8
6	1 800	360	48

  

1800
+ 360
+ 48
<hr/>
2208
<hr/>

Th H T U
3 6 8
x    6
4 8 (8 × 6)
3 6 0 (60 × 6)
+ 1 8 0 0 (300 × 6)
<hr/>
2 2 0 8

Th H T U
3 6 8
x    6
4 8 (8 × 6)
3 6 0 (60 × 6)
+ 1 8 0 0 (300 × 6)
<hr/>
2 2 0 8

Th H T U
3 6 8
x    6
<hr/>
2 2 0 8
4 4

The place value columns are labelled to ensure children understand the size of the partitioned digits in the original number(s) and in the answer.

It is vital that the teacher models the correct language when explaining the process of the compact method.

The example shown should be explained as:

*“Starting with the least significant digit... 8 multiplied by 6 is 48, put 8 in the units and carry 4 tens (40).*

*6 tens multiplied by 6 are 36 tens. Add the 4 tens carried over to give 40 tens (which is the same as 4 hundreds and 0 tens). Put 0 in the tens place of the answer and carry 4 hundreds.*

*3 hundreds multiplied by 6 are 18 hundreds. Add the 4 hundreds carried over to give 22 hundreds (which is the same as 2 thousands and 2 hundreds). Write 2 in the hundreds place of the answer and 2 in the thousands place of the answer.”*

Children should recognise that the answer is close to an estimated answer of  $400 \times 6 = 2\,400$

Long multiplication could also be introduced by comparing the grid method with the compact vertical method. Mentally totalling each row of answers is an important step in children making the link between the grid method and the compact method.

x	600	90	3	
20	12000	1800	60	= 13 860
4	2400	360	12	= 2 772 +
				16 632

Children should only be expected to move towards this next method if they have a secure

The example shown should be explained as:

*“Starting with the least significant digit... 3 multiplied by 4 is 12; put 2 in the units and carry 1 ten (10)*

understanding of place value. It is difficult to explain the compact method without a deep understanding of place value.

Step 1

TTh Th H T U

$$\begin{array}{r} 693 \\ \times 24 \\ \hline \end{array}$$

3 1

Step 2

TTh Th H T U

$$\begin{array}{r} 693 \\ \times 24 \\ \hline \end{array}$$

3 1

Now we are multiplying 693 by 20. Starting with the least significant digit of the top number... 3 multiplied by 20 is 60. Write this answer in.

90 multiplied by 20 is 1 800. There are no units and no tens in this answer, so write 8 in the hundreds place and carry 1 in the thousands.

600 multiplied by 20 is 12 000. Add the 1 (thousand) that was carried to give 13 000. There are no units, no tens and no hundreds in this answer, so write 3 in the thousands place and 1 in the ten thousands place.

The final step is to total both answers using efficient columnar addition.

Step 3

TTh Th H T U

$$\begin{array}{r} 693 \\ \times 24 \\ \hline \end{array}$$

$$\begin{array}{r} 13000 \\ + 13860 \\ \hline 27720 \end{array} \quad (693 \times 4)$$

✓

When using the compact method for long multiplication, all carried digits should be placed below the line of that answer e.g.  $3 \times 4$  is 12, so the 2 is written in the units column and the 10 is carried as a small 1 in the tens column.

This carrying below the answer is in line with the written addition policy in which carried digits are always written below the answer/line.



**End of Year Objective:**

**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.**

Children may continue to use the key facts box for as long as they find it useful. Using their knowledge of linked tables facts, children should be encouraged to use higher multiples of the divisor. During Year 5, children should be encouraged to be efficient when using the chunking method and not have any subtraction steps that repeat a previous step. For example, when performing  $347 \div 8$  an initial subtraction of 160 ( $20 \times 8$ ) and a further subtraction of 160 ( $20 \times 8$ ) should be changed to a single subtraction of 320 ( $40 \times 8$ ). Also, any remainders should be shown as integers, e.g.

$$523 \div 8$$

$$\begin{array}{r}
 65\text{r}3 \\
 8 \overline{) 523} \\
 - 320 \quad 40x \\
 \hline
 203 \\
 - 160 \quad 20x \\
 \hline
 43 \\
 - 40 \quad 5x \\
 \hline
 3
 \end{array}$$

By the end of year 5, children should be able to use the chunking method to divide a four digit number by a single digit number. If children still need to use the key facts box, it can be extended to include 100x.

$$2458 \div 7$$

$$\begin{array}{r}
 351\text{r}1 \\
 7 \overline{) 2458} \\
 - 2100 \quad 300x \\
 \hline
 358 \\
 - 350 \quad 50x \\
 \hline
 8 \\
 - 7 \quad 1x \\
 \hline
 1
 \end{array}$$

Children should be able to solve real life problems including those with money and measures. They need to be able to make decisions about what to do with remainders after division and round up or down accordingly.