



Calculation Policy

Haresfield C of E Primary School



How we teach it.

Written and mental calculation at Stage 5

Written Addition at Stage 5

Method:

Column Addition

Children will be expected to become familiar with using formal methods of addition with and without carrying.

$500 + 400 + 100 = 1000$.
 Carry the 1000 into the thousands column.

Th	H	T	U
5	8	7	
+	4	7	5
1	0	6	2

line up the H, T & U
Start adding at the units.
As $80 + 70 + 10 = 160$, carry the 100 into the hundreds column.
As $7 + 5 = 12$ carry the ten into the next column.

Leading to:

Column Addition.

By the end of Year 5 children should be comfortable with using column addition to add 4 digit numbers and several numbers with different numbers of digits at the same time.

Th	H	T	U
5	6	7	8
	4	6	8
+		7	2
6	2	1	8
1	2	1	

Ensure that the digits are lined up correctly.
Carry below the line.

Strategies to support:

$123 = 100 + 20 + 3$	<i>Is the same as:</i>	HTU
$+ 45 = \quad \quad 40 + 5$		123
$168 = 100 + 60 + 8$		+ 45
		168

Next Steps:

Adding **decimals** using column addition.

T	U	$\frac{1}{10}$
3	5	2
+	1	6
5	1	2

Carry below the line.
Add '0' as a place holder

Mental Addition at Stage 5

Children should be able to recall:

- Sums of decimals.
E.g. $6.5 + 2.7$
- Doubles of decimals.
E.g. Double 3.4

- What must be added to any four digit number to make the next multiple of 1000.
E.g. $4087 + ? = 5000$

- What must be added to a decimal with units and tenths to make the next whole number.
E.g. $7.2 + ? = 8$

Working mentally, children should be able to:

- Add a pair of two digit numbers or three-digit multiples of 10.
E.g. $38 + 86$, $620 + 380$

- Add a near multiple of 10 or 100 to any two-digit or three digit number.
E.g. $235 + 198$

- Add any pair of decimal fractions each with units and tenths.
E.g. $5.7 + 2.5$

Children should know when to:

- Count on in hundreds tens, ones and tenths.
- Partition: Add hundreds, tens or ones separately, then recombine.

- Add a multiple of 10 or 100 and adjust.
E.g. $235 + 198 = 235 + 200 - 2$
- Partition: Double and adjust.

- Use knowledge of place value and related calculations.
E.g. $6.3 + 4.8$ using $63 + 48$
- Partition: Count on in minutes and hours, bridging through 60.

Written Subtraction at Stage 5

Method:

The Expanded Method of Subtraction and Column Subtraction.

The expanded method of addition will be taught alongside Column Subtraction to allow children to see how each relates to the other.

Because you can't 'do' 2-5, exchange a ten for ten units.

Exchange with the next digit.

$$\begin{array}{r}
 362 = 300 + \cancel{50} + \cancel{2} \\
 245 = 245 + 40 + 5 \\
 \hline
 117 = 100 + 10 + 7
 \end{array}$$

$$\begin{array}{r}
 512 \\
 \cancel{3} \cancel{6} \cancel{2} \\
 - 245 \\
 \hline
 117
 \end{array}$$

Recombine to get the answer.

50-60 12-5

Leading to:

Column Subtraction.

Children will move on to using Column Subtraction on its own and with larger numbers.

Exchange with the next digit.

$$\begin{array}{r}
 415 \\
 \cancel{3} \cancel{5} \cancel{7} \\
 \hline
 363 \\
 \hline
 3194
 \end{array}$$

3000 - 0

150 - 60 = 90

Start subtracting from the units

Strategies to support:

Practise using the expanded method of subtraction on its own and without borrowing.

Partition both numbers.

$$\begin{array}{r}
 789 = 700 + 80 + 9 \\
 - 65 = + 60 + 5 \\
 \hline
 + 20 + 4
 \end{array}$$

Subtract the bottom number from the top.

Recombine to get the answer.

80-60 9-5

Next Steps:

Subtracting **decimals** using Column Subtraction.

Exchange with the next digit.

Line up the H, T & $\frac{1}{10}$

$$\begin{array}{r}
 2 \\
 \cancel{3} 16.5 \\
 - 17.0 \\
 \hline
 19.5 \\
 \hline
 16-9
 \end{array}$$

Add '0' as a place holder.

2-1

16-9

Mental Subtraction at Stage 5

Children should be able to recall:

- Differences of decimals.
E.g. $7.8 - 1.3$
- Halves of decimals.
E.g. Half of 5.6

- What must be added to any four digit number to make the next multiple of 1000.
E.g. $5000 - 4087 = ?$

- What must be added to a decimal with units and tenths to make the next whole number.
E.g. $8 - 7.2 = ?$

Working mentally, children should be able to:

- Subtract pair of two digit numbers or three-digit multiples of 10.
E.g. $620 - 380$, $62 - 38$

- Subtract a near multiple of 10 or 100 to any two-digit or three digit number.
E.g. $235 - 198$
- Find the difference between near multiples of 100 or 1000.
E.g. $607 - 588$, $6070 - 4087$

- Subtract any pair of decimal fractions each with units and tenths.
E.g. $5.7 - 2.5$

Children should know when to:

- Count back in hundreds tens, ones and tenths.
- Subtract by counting up from the smaller to the larger number.

- Subtract a multiple of 10 or 100 and adjust.
E.g. $280 - 98 = 280 - 100 + 2$

- Use knowledge of place value and related calculations.
E.g. $6.3 - 4.8$ using $63 - 48$
- Partition: Count back in minutes and hours, bridging through 60.

Written Multiplication at Stage 5

Method:

The Grid Method of Multiplication.

Children will continue to use the Grid Method of Multiplication when multiplying a single digit by a larger number.

$123 \times 4 = 492$

Partition the number into H, T & U

	100	+	20	+	3	
4	400	+	80	+	12	= 492

Put the single digit here.

4×100 4×20 4×3

Recombine to get the answer.

Leading to:

Multiplying larger numbers using the Grid Method.

Children will go on to multiply 2-digit by 2-digit numbers using the Grid Method. Children need to be secure in their place value and knowledge of multiplication of multiples of 10 and 100.

$56 \times 43 = 2408$

Partition both numbers.

	50	+	6	
40	2000	+	240	= 2240
3	150	+	18	= 168
				<u>2408</u>

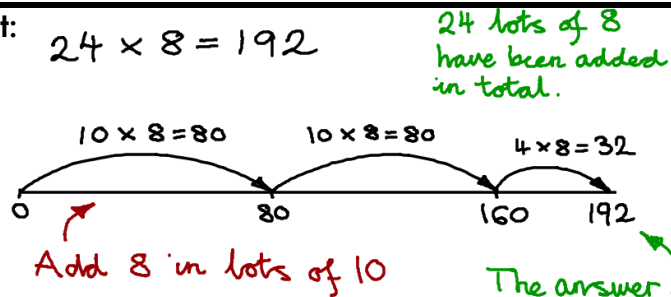
Recombine the rows

Multiply the top numbers by the side.

Add to get the total.

Strategies to support:

Using repeated addition on a number line.



Next Steps:

Multiplying decimal numbers using the grid method.

	5	+	0.2	
6	30	+	1.2	= 31.20
0.3	1.5	+	0.06	= 1.56
				<u>32.76</u>

Take care to line up the digits. Adding a place holder will help.

0.3×0.2

Mental Multiplication at Stage 5

Children should be able to recall:

- Squares to 10×10 .

- Factor Pairs to 100.
E.g. 30 has the factor pairs 1×30 , 2×15 , 3×10 and 5×6

Working mentally, children should be able to:

- Multiply two-digit numbers by 4 or 8.
E.g. 26×4
- Multiply two-digit numbers by 5 or 20.
- Multiply by 25 or 50.

- Double three-digit multiples of 10 to 500.
- Multiply whole numbers and decimals by 10, 100 or 1000.
E.g. 4.3×10 , 0.75×100

- Multiply pairs of multiples of 10 and a multiple of 100 by a single-digit number.
E.g. 60×30 , 900×8

Children should know when to:

- Multiply by 4 or 8 by repeated doubling.
- Form an equivalent calculation.
E.g. To multiply by 5, multiply by 10 then halve. To multiply by 20, double and then multiply by 10.

- Use knowledge of doubles and halves and understanding of place value.
E.g. When multiplying by 50, multiply by 100 then divide by 2.
- Use knowledge of multiplication and place value when calculating with multiples of 10.
E.g. 60×7 using 6×7

- Use understanding that when a number is multiplied by 10 or 100 its digits move one or two places relative to the decimal point and zero is used as a place holder.

Written Division at Stage 5

Method:

Chunking using times table facts.

Children will continue to explore division as repeated subtraction. They will use their increasing knowledge of times tables to subtract in larger chunks.

$$128 \div 7 = 18 \text{ r } 2$$

$$\begin{array}{r}
 7 \overline{) 128} \\
 - 70 \quad (10 \times 7) \\
 \hline
 58 \\
 - 35 \quad (5 \times 7) \\
 \hline
 23 \\
 - 21 \quad (3 \times 7) \\
 \hline
 2
 \end{array}$$

Use the 10 times table to subtract lots of 7.
Subtract using known times table facts.
The remainder.

Leading to:

Chunking using times table facts and multiples of 10.

Using their knowledge of the 10 times table will allow children to divide larger numbers by two-digit numbers while reducing the number of steps.

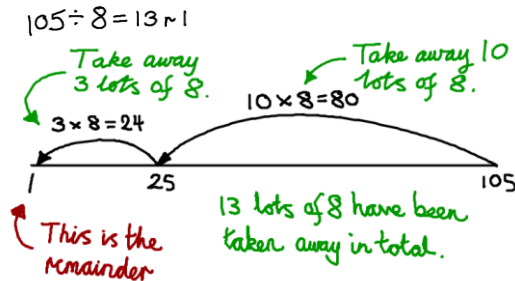
$$197 \div 12 = 16 \text{ r } 5$$

$$\begin{array}{r}
 12 \overline{) 197} \\
 - 120 \quad (10 \times 12) \\
 \hline
 77 \\
 - 60 \quad (5 \times 12) \\
 \hline
 17 \\
 - 12 \quad (1 \times 12) \\
 \hline
 5
 \end{array}$$

Subtract using known times table facts.
10 + 5 + 1 = 16 lots of 12 have been taken away.
The remainder

Strategies to support:

Using repeated subtraction on a number line.



Next Steps:

Expressing the remainder as a fraction.

$$\begin{aligned}
 50 \div 4 &= 12 \text{ r } 2 && \text{The remainder.} \\
 &= 12 \frac{2}{4} && \text{The divisor.}
 \end{aligned}$$

This can then be converted into a decimal.

Mental Division at Stage 5

Children should be able to recall:

- Division facts corresponding to tables up to 10×10 and the related unit fractions.
E.g. $7 \times 9 = 63$ so one-ninth of 63 is 7 and one-seventh of 63 is 9.

- Percentage equivalents of one-half, one-quarter, three quarters, tenths and hundredths.

- Factor Pairs to 100 and corresponding division facts.
E.g. $30 \div 5 = 6$, $30 \div 6 = 5$ using $5 \times 6 = 30$

Working mentally, children should be able to:

- Divide two-digit numbers by 4 or 8.
- Halve three-digit multiples of 10 to 1000.
E.g. $760 \div 2$

- Find the remainder after dividing a two-digit number by a single-digit number.
E.g. $27 \div 4 = 6 \text{ r } 3$
- Divide whole numbers and decimals by 10, 100 or 1000.
- Divide a multiple of 10 by a single-digit number (whole number answers)
E.g. $270 \div 3$

- Find fractions of whole numbers or quantities.
E.g. $\frac{2}{3}$ of 27, $\frac{4}{5}$ of 70 kg
- Find 50%, 25% or 10% of whole numbers of quantities.
E.g. 25% of 20 kg, 10% of £10

Children should know when to:

- Divide by 4 or 8 by repeated halving.
- Use knowledge of division facts.
E.g. when carrying out a division to find a remainder.

- Use understanding that when a number is divided by 10 or 100, its digits move one or two places to the right relative to the decimal point and zero is used as a place holder.

- Use knowledge of equivalence between fractions and percentages.
E.g. To find 50%, 25% and 10%
- Use knowledge of division facts and understanding of place value.
E.g. When calculating with multiples of 10.