Greenholm Primary School

Written Methods

Year 5

Year 3

A three-digit number add ones

$$
\begin{array}{r}
4\ 5\ 3 \\
+\quad\ \ 4 \\
\hline
4\ 5\ 7
\end{array}
$$

3 digit + 1 digit. Not crossing tens barrier.

$$
\begin{array}{r}
4\ 5\ 6 \\
+\quad\ \ 5 \\
\hline
4\ 6\ 1
\end{array}
$$

3 digit + 1 digit. Crossing tens barrier. The ten from eleven is carried to the tens column.

A three-digit number add tens

```
  4 5 6
+   3 2
  -----
  4 8 8
```

3 digit + 2 digit. Not crossing tens barrier.

```
  4 5 6
+   4 5
  -----
  5 0 1
    1 1
```

3 digit + 2 digit. Crossing tens barrier. Carry the ten on from the ones to the tens column. Then the extra ten from the tens column to the hundreds.

A three-digit number add hundreds

3 digit + 3 digit. Not crossing tens barrier.

3 digit + 3 digit. Crossing tens barrier. Carry the ten on from the ones to the tens column. Then the extra ten from the tens column to the hundreds. *Numbers should not exceed 3 digits (999)*

Year 4

The same methods should be applied as Year 3.

Children should be taught up to 4 digits + 4 digits and answers *not exceed 4 digits (9,999)*

Year 5

The same methods should be applied as Year 3 and Year 4.

Children should be taught up to 7 digits + 7 digits and answers *not exceed 7 digits (9,999,999)*

Year 3

A 3-digit number subtract ones

$$
\begin{array}{r}
5\ 7\ 6 \\
-\quad\ \ 4 \\
\hline
5\ 7\ 2 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
5\ \cancel{7}\ ^{1}6 \\
-\quad\ \ 9 \\
\hline
5\ 6\ 7 \\
\hline
\end{array}
$$

3 digits subtract ones. Not crossing tens barrier.

3 digits subtract ones. Crossing tens barrier. The larger digit is on the bottom so you must take from the tens column and add it to the ones. The tens then have one less.

-digit number subtract tens

	5	7	6
−		2	3
	5	5	3

3 digits subtract tens. Not crossing tens barrier.

4 5	16 7	16
−	7	7
4	9	9

3 digits subtract ones. Crossing tens barrier. The larger digit is on the bottom so you must take from the tens column and add it to the ones. The tens then have one less. The tens are larger on the bottom row so you must take from the hundreds column and add it to the tens.

3-digit number subtract hundreds

$$
\begin{array}{r}
5\ 7\ 6 \\
-\ 3\ 4\ 5 \\
\hline
2\ 3\ 1 \\
\hline
\end{array}
$$

3-digit number subtract hundred. Not crossing tens barrier.

You can also use subtractions where you can have digits being moved between any of the columns. Teaching should ensure that this occurs and that children are secure with how to move digits from any column so they can subtract accurately.

<u>Year 4</u>

Children should use the same methods as Year 3.

They should use up to 4 digits subtract 4-digit numbers and begin with the largest digit *__not exceeding 9,999.__*

<u>Year 5</u>

Children should use the same methods as Year 3 and Year 4.

They should use 7 digits subtract 7-digit numbers and begin with the largest digit *__not exceeding 9,999,999.__*

Year 3

Place Value Grid

Tens	Ones
				60
				00
				00

$3 2 \times 3 = 9 6$ ✓

Place Value Grid

Tens	Ones
		00
		00
		00

$12 \times 3 = 36$ ✓

Place Value Grid

Tens	Ones
			0000
			0000

$24 \times 2 = 48$ ✓

Multiplication. Not crossing tens barrier. Children apply the type of skills they have learnt in Year 2 that helps them multiplied by one-digit questions.

L.O To multiply 2 by 1 digit numbers

How close can you get to 100?
Use each digit card once in the multiplication.

[2] [3] [4]

[ ][ ] × [ ] =

3 4 × 2 = 6 8 ✓
2 4 × 3 = 7 2 ✓
4 2 × 3 = 1 2 6 ✓

L.O Great work!

Place Value Grid

Hundreds	Tens	Ones
	|||	o ooo
	|||	oo oo
	6	8

Place Value Grid

Hundreds	Tens	Ones
	||	oooo
	||	o ooo
	||| 7	oo oo 8o

Place Value Grid

Hundreds	Tens	Ones
	||||	o o
	|||	o o
	||| 2	oo 6

Multiplication. Two digits multiplied by one digit. Crossing tens barrier. Children use their Year 2 skills and skills from not crossing tens barrier to be able to carry across columns.

```
  4  2              2  8

×     3          ×     4
―――――――――        ―――――――――
1  2  6          1  1  2
―――――――――        ―――――――――
                      3
```

Multiplication. Two digits multiplied by one digit. Crossing tens barrier.

Children progress from using the dieines to a formal written column method and where they are able to carry from ones to tens and add appropriately where needed.

Year 4

Children should use the same methods as Year 3.

Children should be taught to multiply up to 3-digit numbers multiplied by a one-digit number.

Children should use the same methods as Year 3 and Year 4.

Children should be taught to multiply up to 4-digit numbers multiplied by a one-digit number or a two-digit number. Multiplying by a 2-digit number example below:

$$
\begin{array}{r}
2\;6\;3\;4 \\
\times\quad 2\;6 \\
\hline
1\;5\;8\;0\;4 \\
\;3\;2\;2
\end{array}
$$

Step 1: multiply the top row digit by the 6 in the one's column.

$$
\begin{array}{r}
2\;6\;3\;4 \\
\times\quad 2\;\cancel{6} \\
\hline
1\;5\;8\;0\;4 \\
\;3\;2\;2 \\
0
\end{array}
$$

Step 2: add a zero as you are about to multiply by a multiple of 10. I have crossed the 6 out in the ones column as I am now about to multiply by the 2 in the tens column.

Step 3: multiply the top row of digits by the 2 in the tens column.

$$\begin{array}{r}
2\ 6\ 3\ 4 \\
\times\quad 2\ \cancel{6} \\
\hline
1\ 5\ 8\ 0\ 4 \\
{\scriptstyle 3\ 2\ 2} \\
5\ 2\ 6\ 8\ 0 \\
\hline
\end{array}$$

Step 4: add the two numbers you have from your multiplications to gain your final answer.

$$\begin{array}{r}
2\ 6\ 3\ 4 \\
\times\quad 2\ \cancel{6} \\
\hline
1\ 5\ 8\ 0\ 4 \\
{\scriptstyle 3\ 2\ 2} \\
+\ 5\ 2\ 6\ 8\ 0 \\
\hline
6\ 8\ 4\ 8\ 4 \\
\hline
\end{array}$$

Division

Year 5 should use the gate method and divide up to a four-digit number by a 1-digit or 2-digit number. Where dividing by two-digit numbers, children should list multiplies of the divisor number. Children should list as far as is needed for the dividend number.

```
           1
      ┌─────────────
12 ) 1̸ ⁱ6 ⁴0  8

 2 4
```
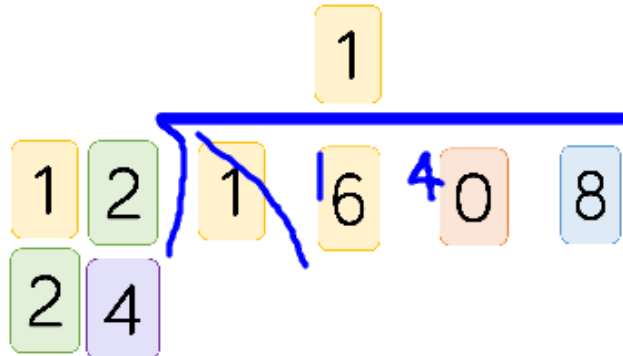
Step 1: cross out 1 and carry to the 6 to make 16. List multiples of 12 until you reach or the next number past 16. Add your number above 16 and carry over the difference to the next digit in the dividend number.

```
        1   3
      ┌─────────────
12 ) 1̸ ⁱ6 ⁴0 ⁴8

 2 4

 3 6

 4 8
```
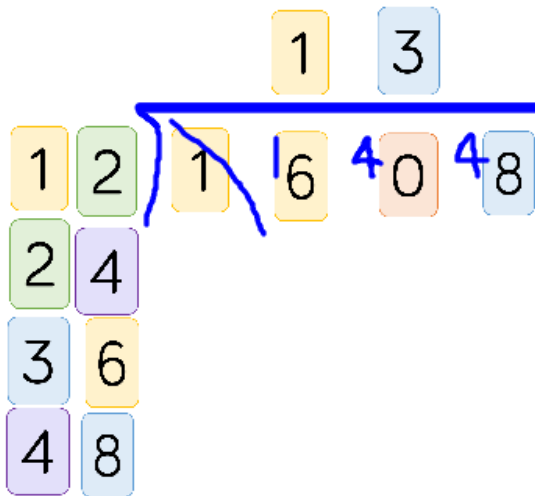
Step 2: Continue to list multiples of the divisor until you reach 40 or the next number beyond 40. Add the number above 40 and carry over the difference to the final digit in the dividend number.

$$\begin{array}{r} 1\ \ 3\ \ 4 \\ 12\overline{)1\ \ {}^16\ \ {}^40\ \ {}^48} \end{array}$$

$$\begin{array}{l} 1\ 2 \\ 2\ 4 \\ 3\ 6 \\ 4\ 8 \end{array}$$

Step 3: List any further multiples needed. Add your final answer above 40.

In the Autumn term, they should have answers that contain a remainder represented as 'r'

This should happen for dividing by both 1 digit and 2-digit numbers.

$$\begin{array}{r} 5\ \ 2\ \ 1\ \ r\ 6 \\ 7\overline{)3\ \ {}^36\ \ {}^15\ \ {}^13} \end{array}$$

By the Spring term, children should be able to represent the remainder as a fraction.

$$\begin{array}{r} 5\,2\,1\,6 \\[-2pt] 7\,\overline{)3\,^36\,^15\,^33} \end{array} \quad r\ 7$$

By the Summer term, children should be able to represent the remainder as a decimal and round to decimal places where necessary.

$$\begin{array}{r} 5\,2\,1\,{\cdot}\,8 \\[-2pt] 7\,\overline{)3\,^36\,^15\,^33\,{\cdot}\,^60\,^40} \end{array}$$

Step 1: After 7 went into 13 once there was a remainder of 6. This 6 moves to the tenths column where there is also a zero. Remember to include the decimal point (as shown in the example) both above and below the horizontal line. 7 goes into 60 8 times with a remainder of 4, so the four then goes to the hundredths column to make 40.

5 2 1 . 8 5 7

7) 3 ³6 5 3 . ⁶0 ⁴0 ⁵0

Step 2: Continue the method until you reach three decimal places. If you're answer fits into one decimal or two decimal places with no further remainders then write your answer to one or two decimal places.

5 2 1 . 8 6̶5̶ 7̶

7) 3 ³6 5 3 . ⁶0 ⁴0 ⁵0

Step 3: Apply the principles of rounding. The 7 in the thousandth's column is larger than 5, so the 5 in the hundredths column rounds up to become and 6. I have crossed the digit in the thousandths column out as this is not needed as part of my final answer.

Add and subtract fractions with the same denominator and denominators that are multiples of the same number (**year 6 to use fractions that are not multiples and children have to find lowest common multiple)**. They extend their understanding of adding and subtracting fractions to calculations that exceed 1 as a mixed number.

Multiply proper fractions and mixed numbers by whole numbers.

<u>multiply fractions</u>

$$\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$$

multiply across the top and across the bottom.

<u>multiply fractions and whole numbers</u>

$$4 \times \frac{1}{3} = \frac{4}{3}$$

multiply whole number by numerator.

Denominator stays the same.

<u>multiply mixed number and whole</u>

$$3\frac{1}{3} \times 4$$

Convert first

$$\frac{10}{3} \times 4 = \frac{40}{3}$$

Then same method as before

Pupils connect multiplication by a fraction to using fractions as operators (fractions of), and to division, building on work from previous years.

Dividing fraction by whole number

$$\frac{1}{3} \div 2 = \frac{1}{6}$$

whole multiplied
by the denominator