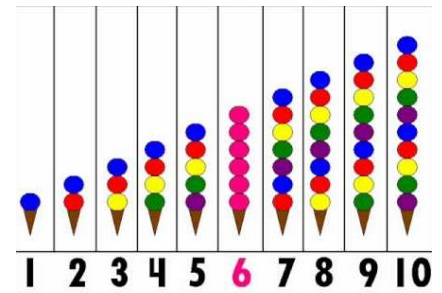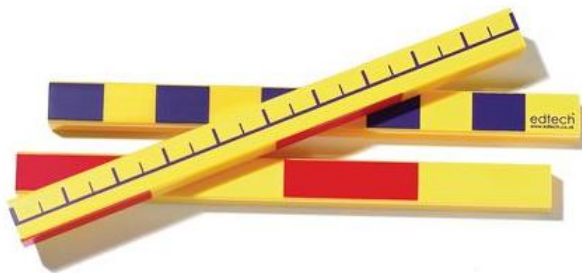# New York Primary School

Calculation Policy

Counting

Throughout school, counting is happening every day. This could be through starters in lessons, lining up for break time or during Maths Meetings.


Addition

Foundation Stage Unit

Children begin to understand the concept of 'addition' and 'equals' using signs accurately. Calculations should be written on either side of the equals sign so that = is not just interpreted as the answer.

$$6 + 2 = 8 \qquad\qquad 8 = 6 + 2$$

Children use practical counting equipment and visual representations to learn to add. They use a range of visuals eg part-part whole models, numicon and tens frames. Mastering Number supports with these skills.

$$2 + 3 = 5$$

4+6   5+5   6+4

$$6+4=10$$
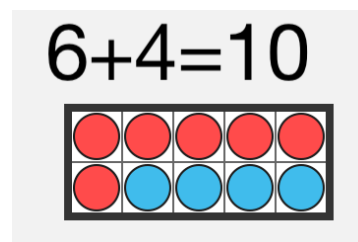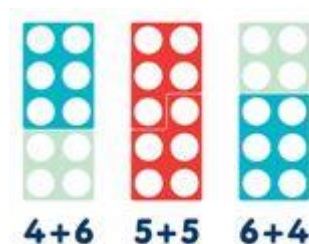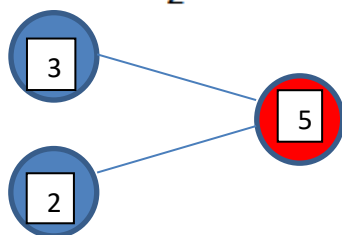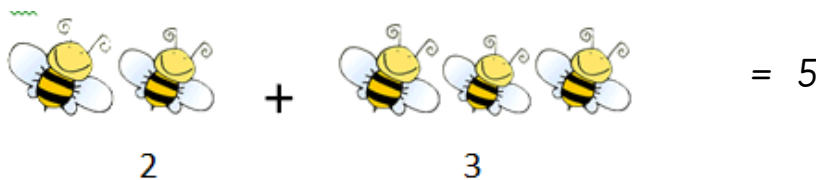
Counting up in ones on a number line.

In FSU, children to have challenges to write 'the story of' a number and use a range of strategies to show age-appropriate numbers.

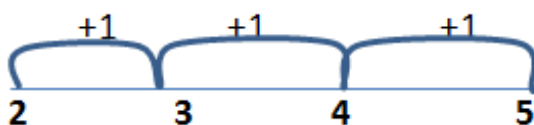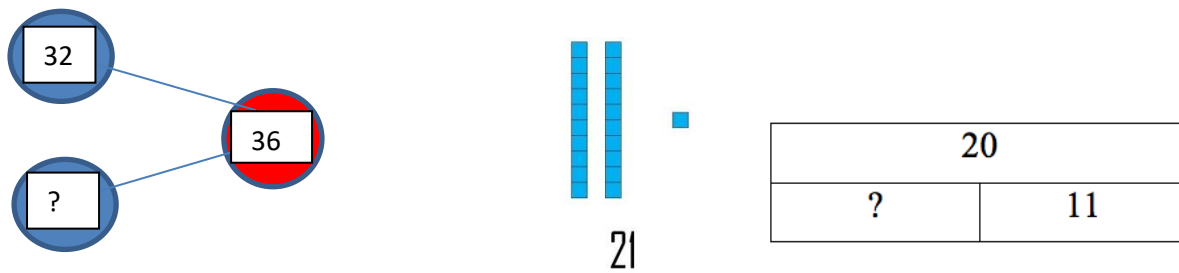Year 2 can add 2 digit numbers using a variety of different strategies: number lines, hundred squares, part-part-whole models, bar models, diennes. Chidlren continue to use Gattegno charts for place value.

By the end of Year 2, children are comfortable with the written method, using diennes to support with this. Calculations are written on either side of the equals sign so that = is not just interpreted as the answer.

$$
\begin{array}{r}
12 \\
+\ 35 \\
\hline
47
\end{array}
$$

Children are encouraged to write 'the story of' a number in order to show a range of strategies.

The inverse should be shown using flipcharts in a variety of ways to introduce the children to the relationship between addition and subtraction.

Year 3 and 4

Pupils will need a deep understanding of place value (through using Gattegno charts and diennes in previous years) to move onto column addition with place value counters.

Show addition methods alongside a variety of visuals eg:

315	
185	?

315 − 185 = ?
185 + ? = 315

?	
185	315

185 + 315 = ?
? − 185 = 315

34 ── 234 ── ?

$$5\ 6\ 7 +$$
$$1\ {}_19\ {}_19$$
$$7\ 6\ 6$$
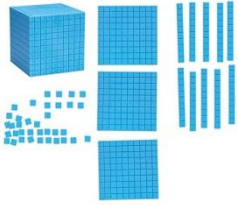
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1000	2000	3000	4000	5000	6000	7000	8000	9000

Show any 'carrying' on 'the doorstep' calculation. Children ensure this is to the left and smaller than the main number.

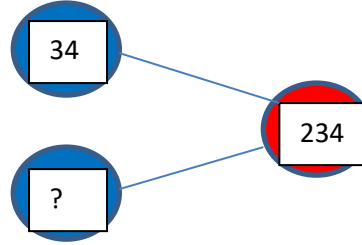Children are encouraged to check work through estimating and find inverse operations on a daily basis as part of a normal lesson.

Children are encouraged to write 'the story of' a number in order to show a range of strategies.

Year 5 and 6

Children continue practise formal written methods using whole numbers and decimal numbers so that they are fluent and accurate.

Word problems and real life situations are shown alongside all teaching, to develop language and reasoning skills.

Children are encouraged to write 'the story of' a number in order to show a range of strategies. Inverse operations and estimating form part of daily lessons.

Subtraction

Foundation Stage Unit

Children begin to understand the concept of 'subtraction' and 'equals' using symbols accurately. Calculations are written of either side of the equals sign so that it is not just interpreted as the answer.

Children use a variety of concrete resources to deepen their understanding.

As with addition, 'the story of' a number is a regular focus to support deeper understanding. Mastering Number supports these skills.

Year 1 and 2

Children begin to 'find the difference' using a variety of strategies. Children continue to use concrete and pictorial representations before moving to abstract.

Calculations are written of either side of the equals sign so that it is not just interpreted as the answer.

By the end of Year 2, children will have a deeper understanding of using column subtraction for 2 digit numbers.

$$\begin{array}{r} 36 \\ -12 \\ \hline 24 \end{array}$$

As with addition, 'the story of' a number is a regular focus to support deeper understanding.

Year 3 and 4

Pupils need a deep understanding of place value and use gattegno charts to support this Children will have a deep understanding of column subtraction methods. These are supported with concrete objects and a variety of representations.

Calculations are written of either side of the equals sign so that it is not just interpreted as the answer.

Short written methods using 'borrowing'.

$$\begin{array}{r} {\overset{8}{7}} {\overset{1}{8}} 9 3 \\ - 5 3 8 5 \\ \hline 2 5 0 8 \end{array} \qquad \begin{array}{r} {\overset{5}{3}} {\overset{16}{6}} . {\overset{1}{7}} 6 \\ - 1 3 . 8 7 \\ \hline 2 2 . 8 9 \end{array}$$
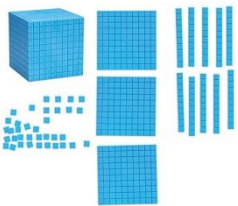
315		315 − 185 = ?
185	?	185 + ? = 315

?		185 + 315 = ?
185	315	? − 185 = 315

Children are encouraged to check work and find inverse operations on a daily basis as part of a normal lesson.

As with addition, 'the story of' a number is a regular focus to support deeper understanding.

Year 5 and 6

Children continue to practise formal written methods using whole numbers and decimal numbers so that they are fluent and accurate.

As with addition, 'the story of' a number is a regular focus to support deeper understanding.

Children are encouraged to estimate and check answers on a daily basis and be able to reason about their work.
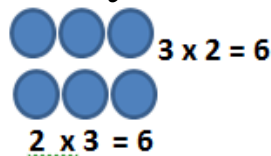
Multiplication

Foundation Stage Unit

Children begin to understand the concept of 'multiplication' and recognise the X sign. They use a variety of visual representations to show grouping of amounts and what multiplication 'looks like'.

3 lots of 2   3 x 2 = 2

4 groups of 2
4 x 2 = 8
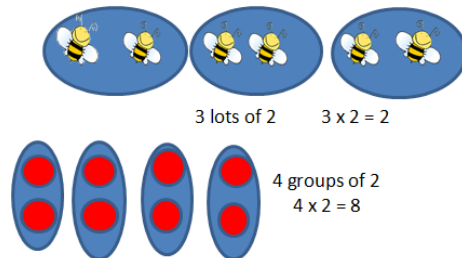
Year 1 and 2

Children understand the concept of 'multiplication' and see different representations during lessons. They continue to use a variety of visual representations to show grouping of amounts and look at relationships using the idea of arrays.

$3 \times 2 = 6$

$2 \times 3 = 6$

By the end of Year 2, children have a deep understanding that multiplication is the same as repeated addition. The use of flipcharts and visuals will support this.

$4 \times 3 = 12$ or $3 + 3 + 3 + 3 = 12$

+3   +3   +3   +3

0   3   6   9   12
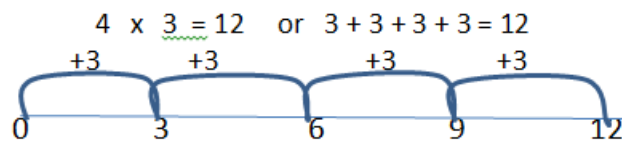
Year 3 and 4

Teachers continue to show visual representations of multiplication tables to pupils using flipcharts. Children make links between multiplication and repeated addition.

$1 \times 4 = 4$

$2 \times 4 = 8$

$3 \times 4 = 12$

Children use the grid method to multiply single digits by 2 digit numbers, moving onto 4 digit numbers.

23 x 8   leading to   (3 7 2 x 4)
Approximate 20 x 10 =200   Approximate 400 x 20 = 8000

X	20	3
8	160	24	=184

x	300	70	2
4	1200	280	8

```
              1200
            +  280
            ───────
                  8
            ───────
               1480
```

Children understand that multiplication and division are inverse operations and have lots of opportunity to explore this.

Children with a deep understanding of the grid method will begin looking at the formal written method in Year 4.

By Year 4, children will be secure with times tables up to 12 X 12.

Estimating using times table knowledge will be built into lessons to ensure children are accurate in their work.

Year 5 and 6

Children develop formal methods to multiply 4 digit numbers by 1 or 2 digit numbers, moving onto methods of long multiplication.

```
23 x 7   A: 20 x 10 = 200          315 x 25   A 300 X 20 = 6000
  2 3              2 3               3 1 5
x   7      to    x  27            x  1225
─────            ─────            ───────
   21              161             15 7 5
+ 140                           +  63 0 0
─────                           ───────
  16 1                             787 5
```

Children understand that multiplication and division are inverse operations and to have lots of opportunity to explore this.

Estimating using times table knowledge is built into lessons to ensure children are accurate in their work.
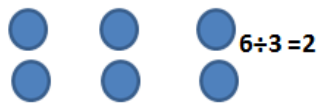
Division

Foundation Stage Unit

Children understand the concept of 'division' as 'grouping' and 'sharing' an amount equally. Children recognise the division sign ÷ . They use a variety of different representations and concrete objects to experiment with number.
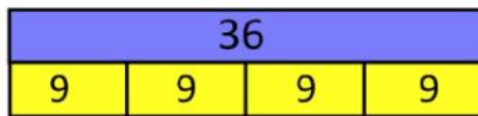

6 shared equally by 3   6÷3 =2

8÷4=2
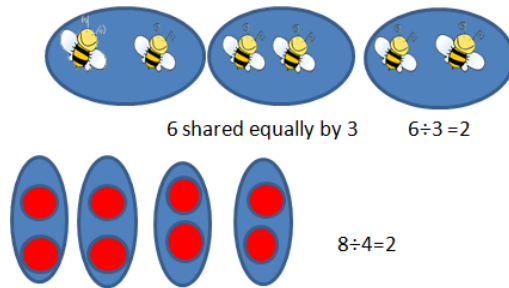
Year 1 and 2

Children will describe division as sharing an amount equally.

To use ÷ sign

6÷3 =2

Calculate 36 ÷ 4

36			
9	9	9	9

6 ÷ 3 = 2 so

2 X 3 = 6

Children use arrays and bar models to support the understanding of this.

By the end of Year 2, children will have a deeper understanding of division and multiplication facts being the inverse and see the relationships between these through a variety of representations.

Year 3 and 4

Children use the formal written method for division, using place value counters to support the understanding of this.

8 ÷ 2   4

36 ÷ 3   1   2

36   Have this recoded alongside counters.

1 2

3 | 3 6

Calculate 36 ÷ 4

36			
9	9	9	9
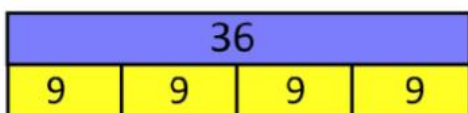
By the end of Year 4, children will recognise division and multiplication as the inverse and this will be addressed often. Children will be able to reason about these relationships.

Children will have a deep understanding about finding remainders when dividing.

56 ÷ 4   411 ÷ 3   541 ÷ 5   8640 ÷ 15

Recommended by the end of year 4

Year 5 and 6

Children use long division methods to divide 3 and 4 digit numbers by 2 digit numbers. Children will have a deep understanding of the relationship between multiplication and division.

Reasoning FSU – KS2

Throughout all areas of calculating and through all year groups, reasoning will be taught in a variety of ways: through reasoning challenges, word problems, plenaries and through a 'prove-it' culture in class.