

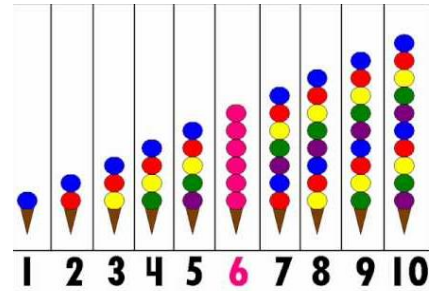
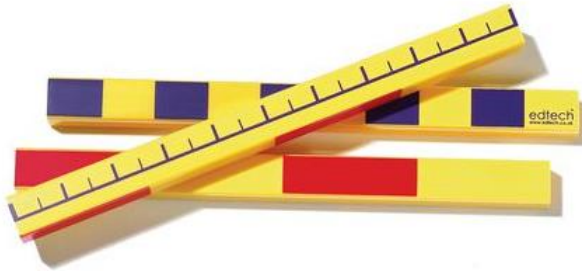


Calculation Policy

Counting

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

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |



Addition

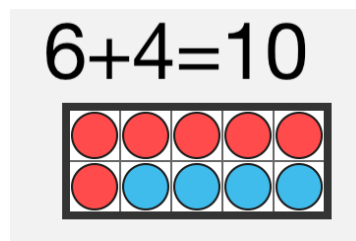
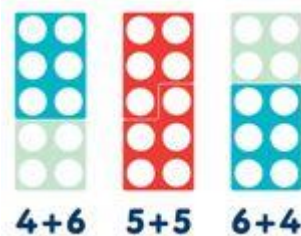
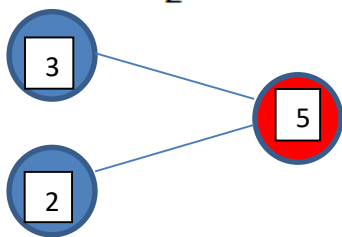
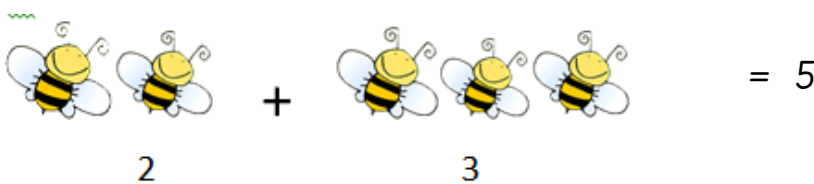
Foundation Stage Unit

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.

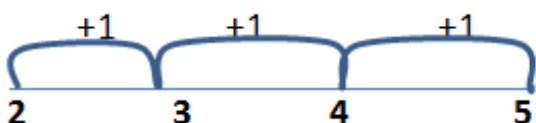
$$6 + 2 = 8$$

$$8 = 6 + 2$$

Children use practical counting equipment and visual representations to learn to add. Use a range of visuals eg part-part whole models, numicon and tens frames.



Counting up in ones on a number line.

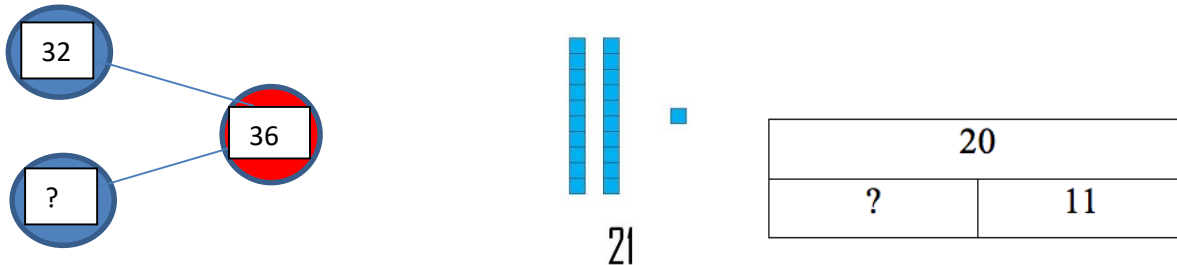


| | | | | | | | | |
|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |

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 1 and 2

Year 2 should be adding 2 digit numbers using a variety of different strategies: number lines, hundred squares, part-part-whole models, bar models, diennes. Continue to use Gattegno charts for place value.



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

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

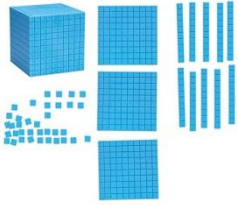
Children should be encouraged to write 'the story of' a number in order to show a range of strategies.

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

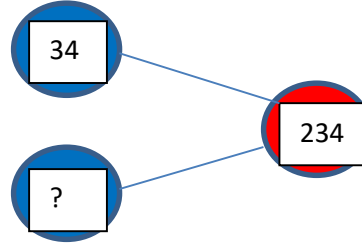
Pupils will need a deep understanding of place value (through using Gattegno charts and diennes in previous years) to move onto column addition with place value counters.

Show addition methods alongside a variety of visuals eg:



| | | |
|-----|---|-----------------|
| 315 | | $315 - 185 = ?$ |
| 185 | ? | $185 + ? = 315$ |

| | | |
|-----|-----|-----------------|
| ? | | $185 + 315 = ?$ |
| 185 | 315 | $? - 185 = 315$ |



$$\begin{array}{r} 1 \\ 643 \\ +228 \\ \hline 871 \end{array}$$

Show any 'carrying' on top of the calculation so that this can be seen clearly with place value counters.

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

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

Year 5 and 6

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

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

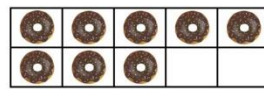
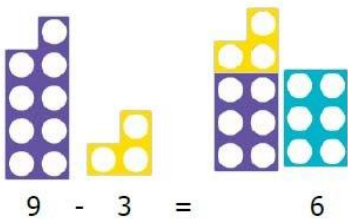
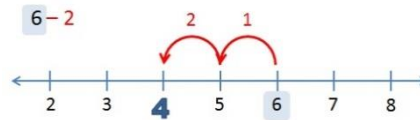
Children should be encouraged to write 'the story of' a number in order to show a range of strategies. Inverse operations and estimating should form part of daily lessons.

Subtraction

Foundation Stage Unit

Begin to understand the concept of 'subtraction' and 'equals' using symbols accurately. Calculations should be 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.



8 - 4 =

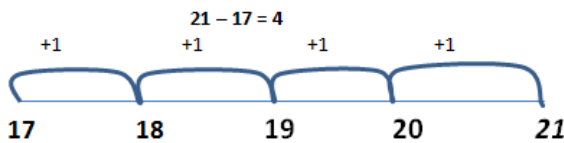
| | | | | | | | | |
|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 |



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

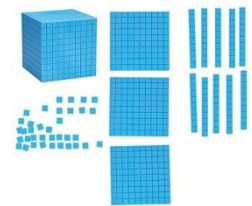
Year 1 and 2

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



58 - 22 = 36

| | | | | | |
|----|----|----|----|----|----|
| 35 | 36 | 37 | 38 | 39 | 40 |
| 45 | 46 | 47 | 48 | 49 | 50 |
| 55 | 56 | 57 | 58 | 59 | 60 |



Calculations should be 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 should 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 should be a regular focus to support deeper understanding.

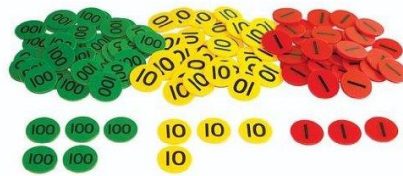
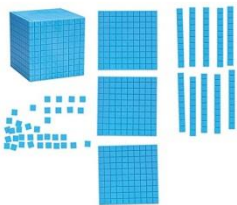
Year 3 and 4

Pupils need a deep understanding of place value, using gattegno charts to support this, to have a deep understanding of column subtraction methods. These need to be supported with concrete objects and a variety of representations.

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

Short written methods using 'borrowing'.

$$\begin{array}{r} 81 \\ 7893 \\ - 5385 \\ \hline 2508 \end{array} \qquad \begin{array}{r} 5161 \\ 36.76 \\ - 13.87 \\ \hline 22.89 \end{array}$$



| | |
|-----|-----------------|
| 315 | 315 - 185 = ? |
| 185 | ? 185 + ? = 315 |

| | |
|-----|-------------------|
| ? | 185 + 315 = ? |
| 185 | 315 ? - 185 = 315 |

Children should be 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 should be a regular focus to support deeper understanding.

Year 5 and 6

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

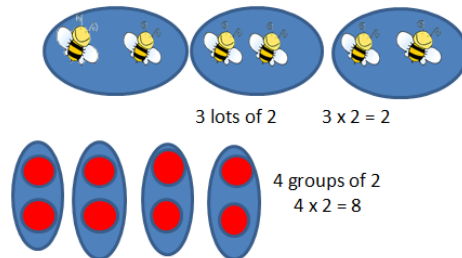
As with addition, 'the story of' a number should be a regular focus to support deeper understanding.

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

Multiplication

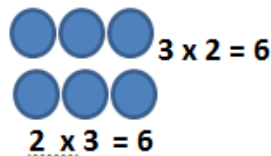
Foundation Stage Unit

Begin to understand the concept of 'multiplication' and recognise the X sign. Use a variety of visual representations to show grouping of amounts and what multiplication 'looks like'.

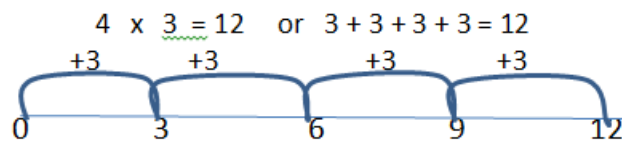


Year 1 and 2

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

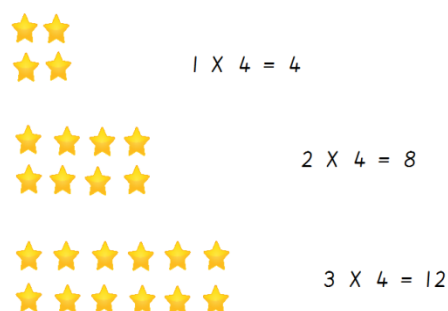


By the end of Year 2, children need to have a deep understanding that multiplication is the same as repeated addition. The use of flipcharts and visuals will support this.



Year 3 and 4

Continue to show visual representations of multiplication tables to pupils using flipcharts. Make links between multiplication and repeated addition.



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

| | |
|--|---|
| $\begin{array}{r} 23 \times 8 \\ \hline \end{array}$ <p>Approximate $20 \times 10 = 200$</p> $\begin{array}{ c c } \hline \times & 20 & 3 \\ \hline 8 & 160 & 24 \\ \hline \end{array} = 184$ | <p>leading to</p> (372×4) <p>Approximate $400 \times 20 = 8000$</p> $\begin{array}{ c c c } \hline \times & 300 & 70 & 2 \\ \hline 4 & 1200 & 280 & 8 \\ \hline \end{array} + \begin{array}{r} 1200 \\ 280 \\ 8 \\ \hline 1480 \end{array}$ |
|--|---|

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

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

By Year 4, children need to be secure with times tables up to 12×12 .

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

Year 5 and 6

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

| | | |
|---|--|--|
| $\begin{array}{r} 23 \times 7 \\ \hline 23 \\ \times 7 \\ \hline 21 \\ + 140 \\ \hline 161 \end{array}$ <p>A: $20 \times 10 = 200$</p> | <p>to</p> $\begin{array}{r} 23 \\ \times 27 \\ \hline 161 \end{array}$ | $\begin{array}{r} 315 \times 25 \\ \hline 315 \\ \times 1225 \\ \hline 1575 \\ + 6300 \\ \hline 7875 \end{array}$ <p>A $300 \times 20 = 6000$</p> |
|---|--|--|

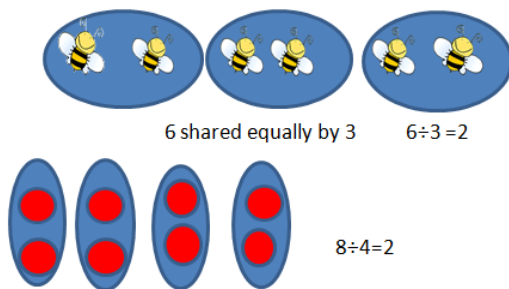
Children to understand that multiplication and division are inverse operations and to have lots of opportunity to explore this.

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

Division

Foundation Stage Unit

To understand the concept of 'division' as 'grouping' and 'sharing' an amount equally. Children to recognise the division sign \div . Use a variety of different representations and concrete objects to experiment with number.



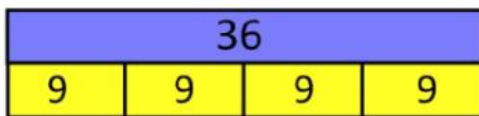
Year 1 and 2

Children will describe division as sharing an amount equally.

To use \div sign



Calculate $36 \div 4$



$6 \div 3 = 2$ so

$2 \times 3 = 6$

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

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

$8 \div 2$ 4

| | | | | |
|---|---|---|---|---|
| 2 | 1 | 1 | 1 | 1 |
| | 1 | 1 | 1 | 1 |

$36 \div 3$ 1 2

| | | | |
|---|---|---|---|
| 3 | 1 | 1 | 1 |
| | 1 | 1 | 1 |
| | 1 | 1 | 1 |

36 Have this recoded alongside counters.

$3 \overline{) 36}$

12

36

Calculate $36 \div 4$



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.

| | | | |
|--|---|--|--|
| $56 \div 4$ | $\underline{411} \div 3$ | $541 \div 5$ | $8640 \div 15$ |
| $\begin{array}{r} 14 \\ 4 \overline{) 56} \\ \underline{4} \\ 16 \\ \underline{16} \\ 0 \end{array}$ | $\begin{array}{r} 137 \\ 3 \overline{) 411} \\ \underline{3} \\ 11 \\ \underline{9} \\ 21 \\ \underline{21} \\ 0 \end{array}$ | $\begin{array}{r} 108r1 \\ 5 \overline{) 541} \\ \underline{5} \\ 41 \\ \underline{40} \\ 1 \end{array}$ | $\begin{array}{r} 108r1 \\ 15 \overline{) 8640} \\ \underline{15} \\ 1140 \\ \underline{15} \\ 90 \end{array}$ |

Recommended by the end of year 4

Year 5 and 6

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

$$\begin{array}{r} \underline{576} \\ 15 \overline{) 8640} \\ \underline{75} \quad (15 \times 5) \\ 114 \\ \underline{-105} \quad (15 \times 7) \\ 90 \end{array}$$

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. Classes use #challenges to explain their thinking.