Nanpean CP School's Written Calculation Policy

Aligned with the 2014 National Curriculum

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in yearly blocks under the following headings: addition, subtraction, multiplication and division. Statements taken directly from the programmes of study are listed in bold at the beginning of each section.

The aims of this policy:

- To ensure consistency and progression in our approach to calculation.
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations.
- To ensure that children can use these methods accurately with confidence and understanding.

Early Years Foundation Stage

National Curriculum Expectations

Statutory Framework 2021

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Development Matters (July 2021)

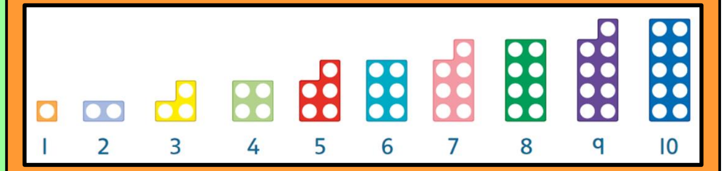
- ✓ count objects, actions and sounds
- ✓ subitise
- ✓ link the number symbol (numeral) with its cardinal number value
- ✓ count beyond 10
- ✓ compare numbers
- ✓ understand the 'one more than or one less than' relationship between consecutive numbers
- ✓ explore the composition of numbers to 10
- ✓ automatically recall number bonds for numbers 0 to 5 and some to 10

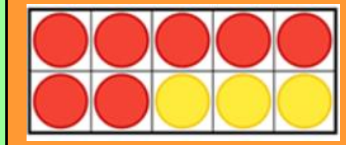
ELG: Number

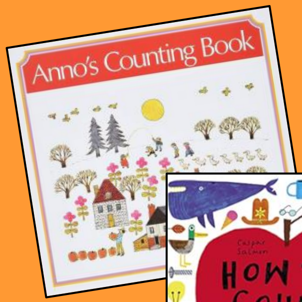
Children at the expected level of development will:

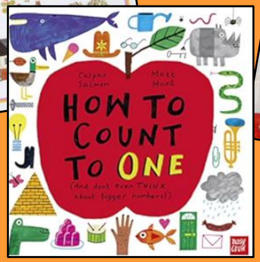
- ✓ Have a deep understanding of number to 10, including the composition of each number.
- ✓ Subitise (recognise quantities without counting) up to 5.
- ✓ Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Representations for calculation in EYFS







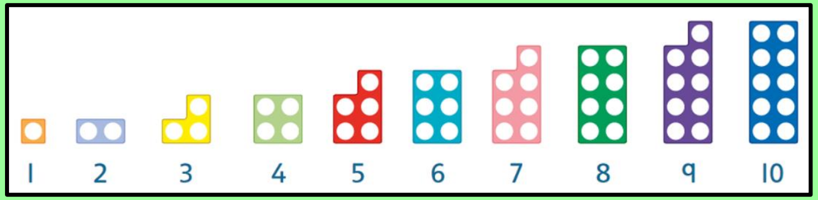


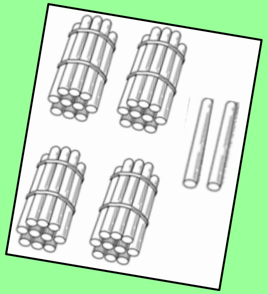
Representations used across school

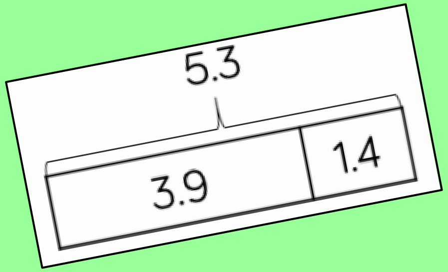
From Early Years to Year 6, we use a wide range of representations to support and develop a deep understanding of mathematical structure. Pupils have the opportunity in all year groups to utilise physical manipulatives to represent maths, as well as developing understanding through using the same manipulatives represented pictorially.

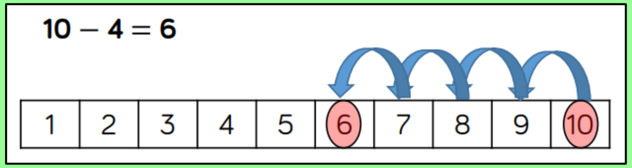
Whilst our calculation policy focuses on the use of ***tens frames and double-sided counters*** in ***EYFS and KS1***, and ***place value grids and place value counters*** in ***Years 3-6*** to support understanding of calculation, we believe that exposing pupils to a wide range of representations to demonstrate the mathematics is crucial in deepening mathematical understanding.

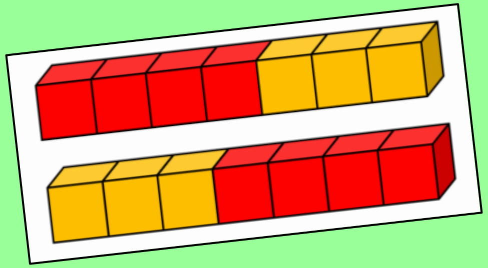
Representations of mathematical structure

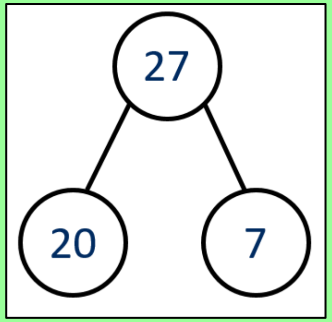


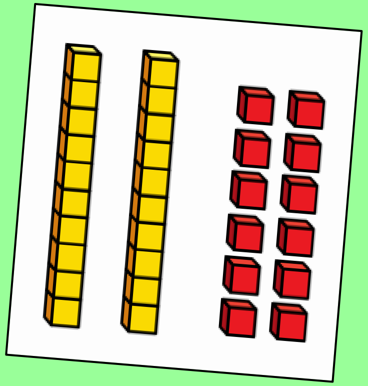


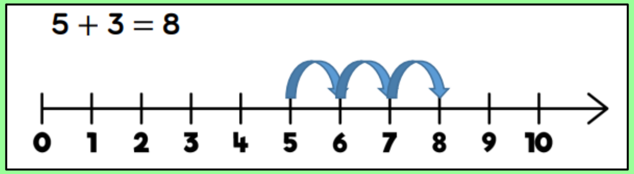


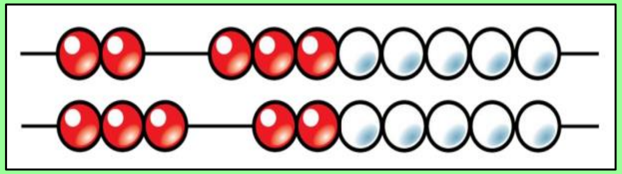












Addition

NC expectations, Key Vocabulary and Oracy

National Curriculum Expectations

Year 1

✓ read, write and interpret mathematical statements involving addition (+) and equals (=) signs

✓ represent and use number bonds within 20

✓ add one-digit and two-digit numbers to 20, including zero

✓ solve one-step problems that involve addition using concrete objects and pictorial representations, and missing number problems such as 15 = _ + 6.

Vocabulary

✓ addend

✓ addition

✓ sum

✓ total

✓ altogether

✓ How many more...?

✓ How much more... ?

✓ equals

✓ the same as

✓ partition (splitting a number into its component parts)

Sentence stems

✓ Adding one gives one more.

✓ When zero is added to a number, the number does not change

✓ When adding numbers, the total will be the same whichever pair we add first (commutative law).

✓ The whole is (number). One part is (number), so the other part must be (number). OR (number) is the whole, (number) is a part, (number) is a part.

✓ First there were (number/ item). Then there were (number/ item) added. Now there are (number/ item).

✓ There are (number/ item) and (number/ item). We can write this a (number) plus (number).

✓ (number) is equal to (number) plus (number). OR (number) plus (number) is equal to (number).

✓ There are (number/ item). There are (number/ item). There are (number/ item/ description) altogether.

✓ (number) plus (number) is equal to ten.

Year 2

✓ solve problems with addition: to using concrete objects and pictorial representations, including those involving numbers, quantities and measure; applying their increasing knowledge of mental and written methods

✓ recall and use addition facts to 20 fluently, and derive and use related facts up to 100

✓ add numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers

✓ show that addition of two numbers can be done in any order (commutative)

✓ recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Vocabulary

✓ commutative (numbers can be added in any order)

✓ crossing the (tens) boundary or bridging

✓ exchange (change a number or expression for another of equal value)

✓ regrouping

✓ inverse

Sentence stems

✓ When adding numbers, we can add them in any order. (Commutative law – this can be applied to 2 or more addends.)

✓ (number) plus (number) is equal to (number) so (number) plus (number) is equal to (number).

✓ (number) minus (number) is equal to (number) so (number) minus (number) is equal to (number).

✓ The value on both sides of the equals symbol must be the same.

✓ When adding 10, the tens digit changes, the ones digit stays the same.

✓ If (number) plus (number) is equal to (number), then (number) tens plus (number) tens is equal to (number) tens.

✓ This is (number). Ten more than (number) is (number). (number) is ten more than (number).

Promote checking answers using the inverse operation.

National Curriculum Expectations

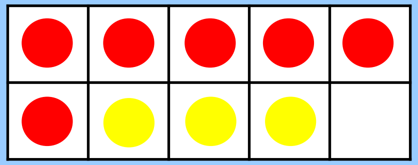
Addition

Year 1

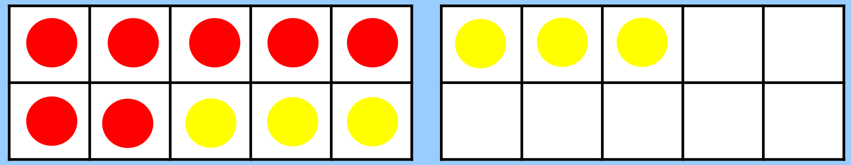
Add two one-digit numbers and a two-digit and one-digit number to 20, including zero.

Load double-sided counters from left to right, top row to bottom row; red side of counter for first addend and yellow side of counters for second addend.

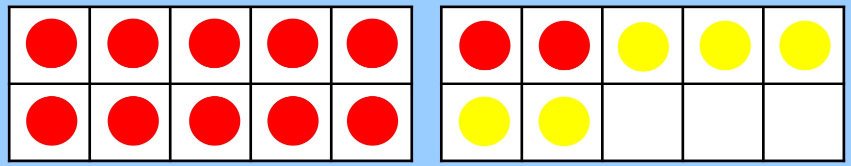
One-digit + one-digit (not crossing ten) Example: 6 + 3 = 9



One-digit + one-digit (crossing ten) Example (two frames): 7 + 6 = 13



Two-digits + one-digit (crossing ten) Example (two frames): 12 + 5 = 17



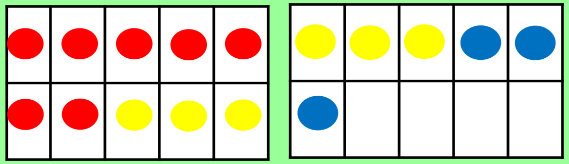
Year 2

Add three one-digit numbers.

Add three one-digit numbers.

Blue counters for third addend.

Example: 7 + 6 + 3 = 16



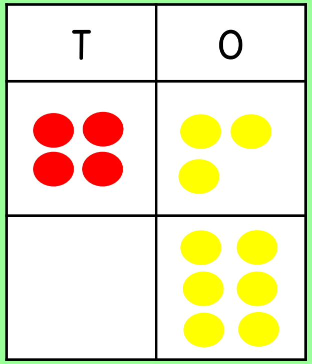
Add up to two two-digit numbers.

Two-digit + one-digit (not crossing ten)

Example: 43 + 6 = 49

Use place value grid, loading the first addend on the top row with PV counters, tens then ones, followed by the second addend on the bottom row. Add the ones, then the ten.

Model the columnar method alongside.



$$\begin{array}{r} 43 \\ +\,06 \\ \hline 49 \\ \hline \end{array}$$

Formal written methods for calculation

Promote checking answers using the inverse operation.

National Curriculum Expectations

Addition

Year 2

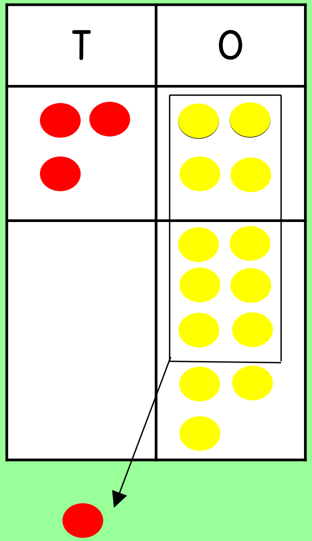
Add up to two two-digit numbers.

Two-digit + one-digit (crossing ten)

Example: 34 + 9 = 43

Use place value grid, loading the first addend on the top row with PV counters, tens then ones, followed by the second addend on the bottom row. Add the ones, showing the regrouping with PV counters.

Model the columnar method alongside.

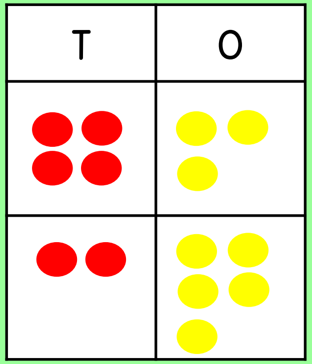


Two-digit + two-digit (not crossing ten)

Example: 43 + 25 = 68

Use place value grid, loading the first addend on the top row with PV counters, tens then ones, followed by the second addend on the bottom row. Add the ones, then the tens.

Model the columnar method alongside.



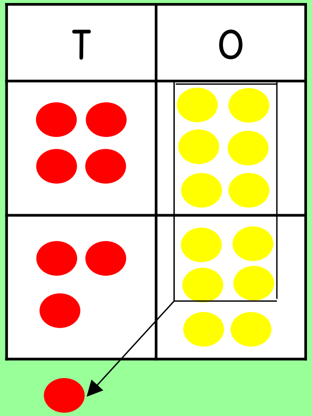
$$\begin{array}{r} 43 \\ +\,25 \\ \hline 68 \\ \hline \end{array}$$

Two-digit + two-digit (crossing ten)

Example: 46 + 36 = 82

Use place value grid, loading the first addend on the top row with PV counters, tens then ones, followed by the second addend on the bottom row. Add the ones, showing the regrouping with PV counters.

Model the columnar method alongside.



$$\begin{array}{r} 46 \\ +\,36 \\ \hline 82 \\ \hline \cancel{1} \end{array}$$

Formal written methods for calculation

Addition

NC expectations, Key Vocabulary and Oracy

National Curriculum Expectations

Year 3

✓ add and subtract numbers mentally, including:

- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds

✓ add numbers with up to three digits, using formal written methods of columnar addition

✓ estimate the answer to a calculation and use inverse operations to check answers

✓ solve problems, including missing number problems, using number facts, place value, and more complex addition

Year 4

✓ add and subtract numbers with up to 4 digits using the formal written methods of columnar addition where appropriate

✓ estimate and use inverse operations to check answers to a calculation

✓ solve addition two-step problems in contexts, deciding which operations and methods to use and why.

Year 5 and Year 6

Year 5:

✓ add whole numbers with more than 4 digits, including using formal written methods (columnar addition)

✓ add numbers mentally with increasingly large numbers

✓ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

✓ solve multi-step problems in contexts, deciding which operations and methods to use and why.

Year 6:

✓ perform mental calculations, including with mixed operations and large numbers

✓ use their knowledge of the order of operations to carry out calculations involving the four operations

✓ solve multi-step problems in contexts, deciding which operations and methods to use and why

Year 3

Vocabulary

✓ addend (a number to be added to another)

✓ sum

✓ minuend (a quantity or number from which another is subtracted)

✓ subtrahend (a number to be subtracted from another)

✓ complement (in addition, a number and its complement make a total **e.g. 300 is the complement of 700 to make 1000)**

✓ exchange (change a number or expression for another of an equal value)

(plus previous)

Sentence stems

✓ Addend plus addend equals the sum.

✓ Minuend minus subtrahend is equal to the difference.

✓ When using column addition start with the right most column.

✓ (number) one(s) add (number) one(s) is equal to (number) one(s).

✓ (number) ten(s) add (number) ten(s) is equal to (number) ten(s).

For 35 + 23. 5 ones add 3 ones is equal to 8 ones. 3 tens add 2 tens is equal to 5 tens.

✓ When adding, if the (ones/ tens/ hundreds) is equal to (10/ 100/ 1,000 etc.), we must regroup to the column on the left.

Year 4

Vocabulary

✓ addend (a number to be added to another)

✓ sum

✓ minuend (a quantity or number from which another is subtracted)

✓ subtrahend (a number to be subtracted from another)

✓ complement **(in addition, a number and its complement make a total e.g. 300 is the complement of 700 to make 1000)**

✓ exchange (change a number or expression for another of an equal value)

✓ regrouping

(plus previous)

Sentence stems

✓ For calculations involving addition and subtraction, we can add then subtract or subtract then add. The final answer will be the same.

Year 5 and Year 6

Vocabulary

✓ additive

✓ estimation

✓ approximate

(plus previous)

Sentence stems

✓ If one addend is increased by an amount and the other addend is decreased by the same amount, the sum remains the same.

✓ If one addend is changed by an amount and the other addend is kept the same, the sum changes by that amount.

✓ If you have increased or decreased the minuend and subtrahend by the same amount, the difference stays the same.

✓ When a whole is split into equal parts, it can be both an additive and a multiplicative number sentence.

✓ The sum of the two known parts plus the missing part is equal to the whole.

✓ (First number) rounds to (number).

✓ (Second number) rounds to (number).

✓ When (adding/ subtracting) (first number) to/from (second number) the answer will be approximately (number).

Promote checking answers using the inverse operation.

National Curriculum Expectations

Addition

Formal written methods for calculation

Year 3

Add numbers with up to three-digits using formal written methods of columnar addition.

Use place value grids and counters as concrete and pictorial strategy.

Two-digit + two-digit

Example: 47 + 76 = 123

```
    4 7
+   7 6
  1 2 3
  1 1
```

Three-digit + three-digit (no regrouping):

Example: 456 + 123 = 579

```
  4 5 6
+ 1 2 3
  5 7 9
```

Three-digit + three-digit (with regrouping):

Example: 385 + 386 = 771

```
  3 8 5
+ 3 8 6
  7 7 1
  1 1
```

Year 4

Add numbers with up to four-digits using formal written methods of columnar addition.

Use place value grids and counters as concrete and pictorial strategy.

Four-digit + four-digit

No regrouping

Example: 2,123 + 3,456 = 5,579

```
  2 1 2 3
+ 3 4 5 6
  5 5 7 9
```

One regroup:

Example: 3,456 + 5,289 = 8,745

```
  3 4 5 6
+ 5 2 8 9
  8 7 4 5
    1 1
```

More than one regroup:

Example: 7,777 + 8,888 = 16,665

```
   7 7 7 7
+  8 8 8 8
 1 6 6 6 5
 1 1 1 1
```

Year 5 and Year 6

Add numbers with more than four-digits including using formal written methods (columnar addition).

Use place value grids and counters as concrete and pictorial strategy.

Examples with multiple regrouping:

52,849 + 18,423 = 71,272

```
  5 2 8 4 9
+ 1 8 4 2 3
  7 1 2 7 2
  1 1     1
```

2,668,777 + 2,776,899 = 5,445,676

```
  2 6 6 8 7 7 7
+ 2 7 7 6 8 9 9
  5 4 4 5 6 7 6
  1 1 1 1 1 1
```

Add decimals (including whole numbers and decimals, decimals with different numbers of decimal places and compliments of 1 (e.g. 0.17 + 0.83 = 1)) using formal written methods (columnar addition)

Decimals with same number of decimal places

Example: 12.49 + 18.75 = 31.24

```
  1 2 . 4 9
+ 1 8 . 7 5
  3 1 . 2 4
  1 1   1
```

Decimals with different number of decimal places

Example: 108.4 + 5.756 = 114.156

```
  1 0 8 . 4 0 0
+ 0 0 5 . 7 5 6
  1 1 4 . 1 5 6
    1 1
```

Add in place holders to 'BOX' the calculation.

Subtraction

NC expectations, Key Vocabulary and Oracy

National Curriculum Expectations

Year 1

✓ read, write and interpret mathematical statements involving subtraction (–) and equals (=) signs

✓ represent and use number bonds and related subtraction facts within 20

✓ subtract one-digit and two-digit numbers to 20, including zero

✓ solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = _ – 9.

Year 2

✓ solve problems with subtraction:

- using concrete objects and pictorial representations, including those involving numbers, quantities and measure
- applying their increasing knowledge of mental and written methods

✓ recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100

✓ subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers

✓ show that subtraction cannot be done in any order

✓ recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Year 1

Vocabulary

✓ how many more...

✓ how much more...

✓ subtract

✓Subtrahend, minuend, difference

✓ take away

✓ left (left over)

✓ fewer

✓ difference

✓ minus

✓ equals

✓ the same as

Sentence stems

✓ Subtracting one gives one less.

✓ When zero is subtracted from a number, the number does not change.

✓ (number) is equal to (number) subtract (number). OR (number) subtract (number) is equal to (number)

✓ The difference between (number) and (number) is (number).

✓ There are (number/ item) and (number/item) are taken away. We can write this as (number) subtract (number).

✓ First there were (number), then (number) were subtracted, (number) were left.

Year 2

Vocabulary

✓ crossing the (tens) boundary

✓ exchange

✓ regrouping

Sentence stems

✓ (number) minus (number) is equal to (number) so (number) minus (number) is equal to (number). There are two ways to use this:

10 minus 7 is equal to 3 so 11 minus 7 is equal to 4. OR 10 minus 7 is equal to 3 so 20 minus 7 is equal to 13.

✓ The value on both sides of the equals symbol must be the same.

✓ The more we subtract, the less we are left with.

✓ The less we subtract, the more we are left with.

✓ When subtracting 10, the tens digit changes, the ones digit stays the same.

✓ If (number) plus (number) is equal to (number), then (number) tens plus (number) tens is equal to (number) tens.

If 3 plus 2 is equal to 5, then 3 tens plus 2 tens is equal to 5 ten.

✓ This is (number). Ten more than (number) is (number). (number) is ten more than (number).

This is 5. Ten more than 5 is 15. 15 is ten more than 5.

✓ If (number) minus (number) is equal to (number), then (number) tens minus (number) tens is equal to (number) tens.

Promote checking answers using the inverse operation.

National Curriculum Expectations

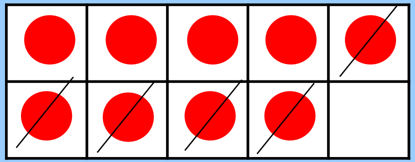
Subtraction

Year 1

Subtract two one-digit numbers and a two-digit and one-digit number to 20, including zero.

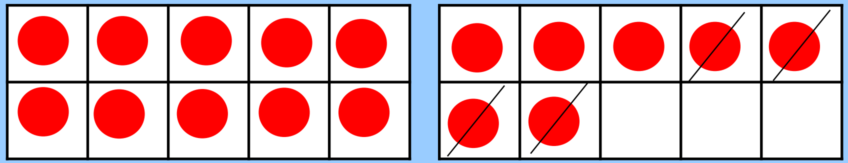
Load double-sided counters from left to right, top row to bottom row; red side of counter for the minuend. Subtract the subtrahend by removing counters when working with the manipulatives, or by crossing out (single diagonal line) the subtrahend, bottom to top, right to left.

One-digit - one-digit Example: 9 – 5 = 4



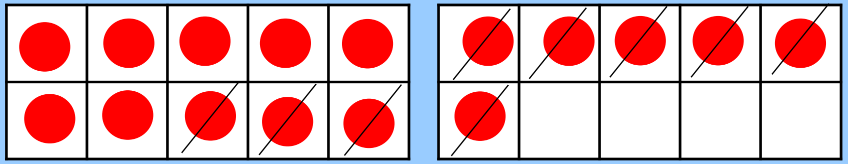
Two-digits - one-digit (not crossing ten)

Example (two frames): 17 – 4 = 13



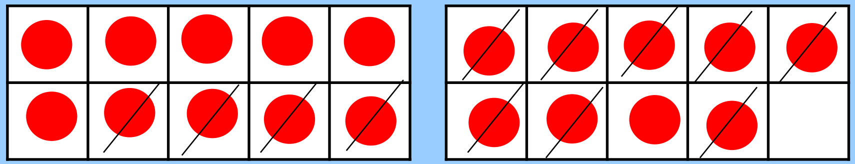
Two-digits - one-digit (crossing ten)

Example (two frames): 16 – 9 = 7



Two-digits - two-digits

Example (two frames): 19 – 13 = 6



Formal written methods for calculation

Promote checking answers using the inverse operation.

National Curriculum Expectations

Subtraction

Year 2

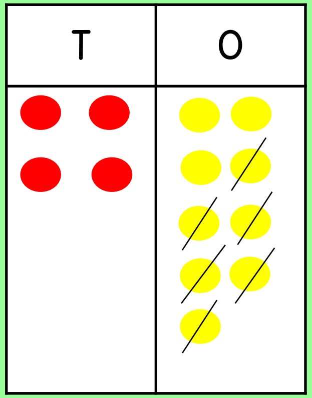
Subtract ones from a two-digit number.

Two-digit – one-digit (not crossing ten)

Example: 49 – 6 = 43

Use place value grid, load the PV grid with the minuend. Subtract the subtrahend by crossing out the PV counters, ones then tens.

Model the columnar method alongside.



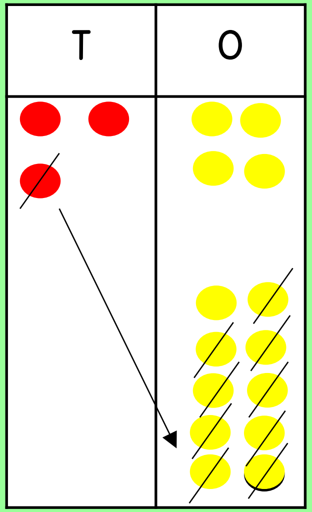
$$\begin{array}{r} 49 \\ -\ 06 \\ \hline 43 \\ \hline \end{array}$$

Two-digit – one-digit (crossing ten)

Example: 34 – 9 = 25

Use place value grid, load the PV grid with the minuend. Exchange one ten for ten ones, showing the ten ones in the ones column with a space to distinguish the exchange. Cross out the exchanged ten. Complete the subtraction of the ones, crossing out the subtrahend.

Model the columnar method alongside.



$$\begin{array}{r} {}^{2}\cancel{3}{}^{1}4 \\ -\ 09 \\ \hline 25 \\ \hline \end{array}$$

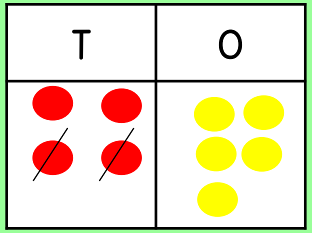
Subtract a tens number from a two-digit number.

Two-digit – tens

Example: 45 – 20 = 25

Use place value grid, load the PV grid with the minuend. Subtract the subtrahend by crossing out the tens PV counters.

Model the columnar method alongside.



$$\begin{array}{r} 45 \\ -\ 20 \\ \hline 25 \\ \hline \end{array}$$

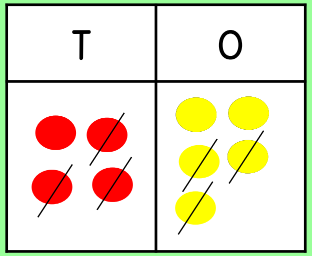
Subtract two two-digit numbers.

Two-digit – two-digit (not crossing ten)

Example: 45 – 33 = 12

Use place value grid, load the PV grid with the minuend. Subtract the subtrahend by crossing out the PV counters, ones first, then tens.

Model the columnar method alongside.



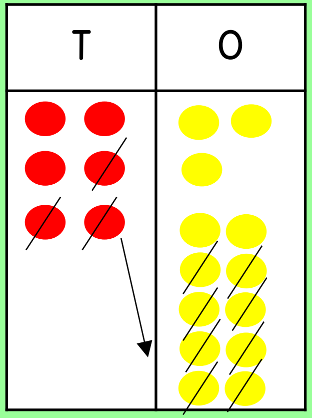
$$\begin{array}{r} 45 \\ -\ 33 \\ \hline 12 \\ \hline \end{array}$$

Two-digit – two-digit (crossing ten)

Example: 63 – 28 = 35

Use place value grid, load the PV grid with the minuend. Exchange one ten for ten ones, showing the ten ones in the ones column with a space to distinguish the exchange. Cross out the exchanged ten. Complete the subtraction of the ones, crossing out the subtrahend. Then complete the subtraction of the tens, crossing out the tens in the subtrahend.

Model the columnar method alongside.



$$\begin{array}{r} {}^{5}\cancel{6}{}^{1}3 \\ -\ 28 \\ \hline 35 \\ \hline \end{array}$$

Formal written methods for calculation

Subtraction

NC expectations, Key Vocabulary and Oracy

	Year 3	Year 4	Year 5 and Year 6
National Curriculum Expectations	✓ subtract numbers mentally, including: o a three-digit number and ones o a three-digit number and tens o a three-digit number and hundreds ✓ subtract numbers with up to three digits, using formal written methods of columnar subtraction ✓ estimate the answer to a calculation and use inverse operations to check answers ✓ solve problems, including missing number problems, using number facts, place value, and more complex subtraction	✓ subtract numbers with up to 4 digits using the formal written methods of columnar subtraction where appropriate ✓ estimate and use inverse operations to check answers to a calculation ✓ solve subtraction two-step problems in contexts, deciding which operations and methods to use and why	Year 5: ✓ subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction) ✓ subtract numbers mentally with increasingly large numbers ✓ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ✓ solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why Year 6: ✓ perform mental calculations, including with mixed operations and large numbers ✓ use their knowledge of the order of operations to carry out calculations involving the four operations ✓ solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Year 3 Vocabulary	Year 3 Sentence stems	Year 4 Vocabulary	Year 4 Sentence stems	Year 5 and 6 Vocabulary	Year 5 and 6 Sentence stems
✓ minuend ✓ subtrahend ✓ difference ✓ exchange (plus previous)	✓ Minuend minus subtrahend is equal to the difference. ✓ When using column subtraction, start with the right most column. ✓ (number) one(s) add (number) one(s) is equal to (number) one(s). ✓(number) ten(s) add (number) ten(s) is equal to (number) ten(s). *For 35 + 23. 5 ones add 3 ones is equal to 8 ones. 3 tens add 2 tens is equal to 5 tens.* ✓ (number) one(s) subtract (number) one(s) is equal to (number) one(s). ✓(number) ten(s) subtract (number) ten(s) is equal to (number) ten(s). *For 35 - 23. 5 ones subtract 3 ones is equal to 2 ones. 3 tens subtract 2 tens is equal to 1 ten.* ✓ If we cannot subtract, we must exchange from the column to the left.	✓ inverse (plus previous)	✓ For calculations involving both addition and subtraction, we can add then subtract or subtract then add. The final answer will be the same.	✓ additive ✓ estimation ✓ approximate (plus previous)	✓ If one addend is increased by an amount and the other addend is decreased by the same amount, the sum remains the same. ✓ If one addend is changed by an amount and the other addend is kept the same, the sum changes by that amount. ✓ If you have increased or decreased the minuend and subtrahend by the same amount, the difference stays the same. ✓ When a whole is split into equal parts, it can be both an additive and a multiplicative number sentence. ✓ For a question where the whole is split into three parts and two of the values are known. ✓ The sum of the two known parts plus the missing part is equal to the whole. ✓ For a question where the whole is split into three parts and two of the values are known, the whole minus the two known parts is equal to the missing parts. ✓ (First number) rounds to (number). ✓ (Second number) rounds to (number). ✓ When (adding/ subtracting) (first number) to/from (second number) the answer will be approximately (number).

Subtraction

National Curriculum Expectations

Year 3

Subtract numbers with up to three-digits using formal written methods of columnar subtraction.

Use place value grids and counters as concrete and pictorial strategy.

Two-digit - two-digit (no exchange)

Example: 74 – 23 = 51

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

Two-digit – two-digit (exchange)

Example: 63 – 48 = 15

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}3 \\ -\ 4\ 8 \\ \hline 1\ 5 \end{array}$$

Three-digit - three-digit (no exchange):

Example: 563 – 241 = 322

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

Three-digit – three-digit (exchange)

Example: 652 – 287 = 365

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{14}\cancel{5}\,{}^{1}2 \\ -\ 2\ 8\ 7 \\ \hline 3\ 6\ 5 \end{array}$$

Three-digit - three-digit (subtracting from hundred with exchange):

Example: 600 – 255 = 345

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}\cancel{0}^{9}\,{}^{1}0 \\ -\ 2\ 5\ 5 \\ \hline 3\ 4\ 5 \end{array}$$

Year 4

Subtract numbers with up to four-digits using formal written methods of columnar subtraction.

Use place value grids and counters as concrete and pictorial strategy.

Four-digit - four-digit

No exchange

Example: 8,469 – 2,127 = 6,342

$$\begin{array}{r} 8\ 4\ 6\ 9 \\ -\ 2\ 1\ 2\ 7 \\ \hline 6\ 3\ 4\ 2 \end{array}$$

More than one exchange

Example: 7,503 – 3,278 = 4,225

$$\begin{array}{r} 7\,{}^{4}\cancel{5}\,{}^{1}\cancel{0}^{9}\,{}^{1}3 \\ -\ 3\ 2\ 7\ 8 \\ \hline 4\ 2\ 2\ 5 \end{array}$$

Subtracting from thousand with exchange

Example: 6,000 – 2,543 = 3,457

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}0 \\ -\ 2\ 5\ 4\ 3 \\ \hline 3\ 4\ 5\ 7 \end{array}$$

Year 5 and Year 6

Subtract whole numbers with more than four-digits using formal written methods (columnar subtraction).

Use place value grids and counters as concrete and pictorial strategy.

Example with exchanges:

52,849 - 18,423 = 34,426

$$\begin{array}{r} {}^{4}\cancel{5}\,{}^{1}2\ 8\ 4\ 9 \\ -\ 1\ 8\ 4\ 2\ 3 \\ \hline 3\ 4\ 4\ 2\ 6 \end{array}$$

N.B. use of a number line to count on to subtract would be most efficient here but seeing the exchanges is important in deepening understanding.

Example subtracting from million:

2,000,000 – 287,941 = 1,712,059

$$\begin{array}{r} {}^{1}\cancel{2}\,{}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}0 \\ -\ 0\ 2\ 8\ 7\ 9\ 4\ 1 \\ \hline 1\ 7\ 1\ 2\ 0\ 5\ 9 \end{array}$$

Add in place holders to 'BOX' the calculation.

Practise subtracting decimals, including a mix of integers and decimals, followed by decimals with different numbers of decimal places.

Decimals with same number of decimal places

Example: 63.75 – 17.28 = 46.47

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{1}3\ .\ {}^{6}\cancel{7}\,{}^{1}5 \\ -\ 1\ 7\ .\ 2\ 8 \\ \hline 4\ 6\ .\ 4\ 7 \end{array}$$

Decimal subtracted from an integer

Example: 14 – 3.692 = 10.308

$$\begin{array}{r} 1\,{}^{3}\cancel{4}\ .\ {}^{1}\cancel{0}^{9}\,{}^{1}\cancel{0}^{9}\,{}^{1}0 \\ -\ 0\ 3\ .\ 6\ 9\ 2 \\ \hline 1\ 0\ .\ 3\ 0\ 8 \end{array}$$

Formal written methods for calculation

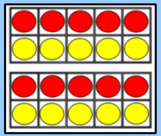
Multiplication

National Curriculum Expectations

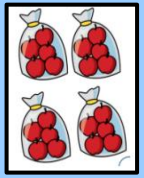
NC expectations, Key Vocabulary and Oracy

Year 1

✓ solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.



Multiplicative reasoning in Year 1:
One bag holds five apples. How many apples will four bags hold?



Children represent multiplication as repeated addition in many different ways. In Year 1, children use concrete and pictorial representations to solve problems. They are not expected to record multiplication formally.

Vocabulary

- ✓ lots of
- ✓ sets of
- ✓ groups of
- ✓ equal groups
- ✓ patterns
- ✓ double
- ✓ doubling
- ✓ twice as much as…
- ✓ twos
- ✓ fives
- ✓ tens
- ✓ skip counting

Sentence stems

Equal groups/ unequal groups

✓ There are (number) groups/lots/sets of (number/ item).

✓ This is not (number) groups/lots/sets of (number/ item) as they are not equal groups.

Double

✓ Double (number) is (number).

✓ Twice as much as (number) is (number).

Year 2

✓ recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

✓ calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs

✓ show that multiplication of two numbers can be done in any order (commutative)

✓ solve problems involving multiplication using materials, arrays, repeated addition, mental methods, and multiplication facts, including problems in contexts

Children represent multiplication as repeated addition in many different ways, including arrays.

In Year 2, children are introduced to the multiplication symbol.

Vocabulary

- ✓ times
- ✓ multiplication
- ✓ multiply
- ✓ multiplied by
- ✓ multiple of
- ✓ ×
- ✓ =
- ✓ array
- ✓ row
- ✓ column
- ✓ repeated addition
- ✓ ten/five times as
- ✓ much/many as…
- ✓ once, twice, three
- ✓ times… ten times
- ✓ multiplication facts
- ✓ multiplication table
- ✓ commutative law
- ✓ commutativity
- ✓ calculation
- ✓ equation

Sentence stems

✓ (number) groups/lots/sets of (number) is the same as (number) times/multiplied by/x (number), which equals/= (number).

✓ (number) is a multiple of (number) because it is in the (number) times table.

✓ (number) cannot be in the (number) times table because…

✓ Multiplication is commutative – you can swap the numbers in the calculation/ equation.

Repeated Addition (array)

✓ There are (number) groups of (number/item). (number) + (number) = (number). There are (number/ item) altogether.

✓ There are (number) lots of (number/ item). There are (total/ item) altogether.

✓ (number a) x (number b) = (number b) x (number a).

✓ In this array, there are (number/ item) in each row. There are (number) rows of (number/ item). So (number) x (number) = (total)

In this array, there are 5 oranges in each row. There are 6 rows of 5 oranges. So 5 × 6 = 30 [Link to fact family: 30 ÷ 5 = 6 and 30 ÷ 6 = 5]

✓ In this array, there are (number/ item) in each column. There are (number) columns of (number/ item). So (number) x (number) = (total)

Multiplication

NC expectations, Key Vocabulary and Oracy

Year 3

National Curriculum Expectations

✓ recall and use multiplication facts for the 3, 4 and 8 multiplication tables
✓ write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
✓ solve problems, including missing number problems, involving multiplication and including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Vocabulary

✓ threes
✓ fours
✓ eighths
✓ product
✓ factor
✓ short multiplication
✓ associative law
✓ associativity
✓ scaling (integers)
✓ correspondance

Sentence stems

✓ I know that (number a) times (number b) equals (number c) because (number b) times (number a) equals (number c).
✓ The product of (number a) and (number b) is (number c).
✓If (number a) x (number b) = (number c), then (number c) ÷ (number a/b) = (number b/a)

Multiply by 4 and 8
✓ To calculate 4 lots of (number), I can double (number) and double the answer.
✓ (multiplier) x 4 = (product)
✓ To multiply by 8, I can double and double again.

Using known facts
✓ If (number a) x (number b) = (number c), then (number a) tens x (number b) = (number c) tens.
✓ If (number a) x (number b) = (number c), then (number c) ÷ (number a/b) = (number b/a)

Scaling
✓ There are (number) times as many (item) as (item).

Year 4

National Curriculum Expectations

✓ recall multiplication facts for multiplication tables up to 12 × 12
✓ use place value, known and derived facts to multiply mentally, including:
- multiplying by 0 and 1
- multiplying together three numbers

✓ recognise and use factor pairs and commutativity in mental calculations
✓ multiply two-digit and three-digit numbers by a one-digit number using formal written layout
✓ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Vocabulary

✓ inverse
✓ distributive law
✓ multiplying by 0 and 1
✓ multiplying by 10, 100

Sentence stems

Inverse
✓ The inverse of 'multiply' is 'divide'.
✓ The distributive law (number a) groups of (number b) is the same as (number c) groups of (number b) plus (number d) groups of (number b).
12 groups of 6 is the same as 10 groups of 6 plus 2 groups of 6
✓ The distributive law: (number) x (number) = (number) x (number) –/+ (number) x (number)
The distributive law:
9 × 8 = 10 × 8 – 1 × 8
11 × 8 = 10 × 8 + 1 × 8

Multiplying by 0
✓ Multiplying anything by 0 gives an answer of 0 as this is the same as no lots of anything.

Multiplying by 1
✓ Multiplying anything by 1 gives the same number as this is the same as one lot of anything.

Multiplying by 10, 100
✓ When multiplying by 10, the digits move one place to the left.
✓ When multiplying by 100, the digits move two places to the left.
✓ When multiplying by (10/ 100), the number is (10/ 100) times bigger.

Multiply by 6
✓ To multiply by 6, I can multiply by 3 and double the answer

Year 5 and Year 6

National Curriculum Expectations

Year 5:
✓ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
✓ know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
✓ establish whether a number up to 100 is prime and recall prime numbers up to 19
✓ 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
✓ multiply numbers mentally drawing upon known facts
✓ multiply whole numbers and those involving decimals by 10, 100 and 1000
✓ recognise and use square numbers and cube numbers, and the notation for squared(^{2}) and cubed (^{3})
✓ solve problems involving multiplication including using their knowledge of factors and multiples, squares and cubes
✓ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
✓ solve problems involving multiplication, including scaling by simple fractions and problems involving simple rates

Year 6:
✓ multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
✓ perform mental calculations, including with mixed operations and large numbers
✓ identify common factors, common multiples and prime numbers
✓ use their knowledge of the order of operations to carry out calculations involving the four operations
✓ solve problems involving multiplication
✓ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Vocabulary

✓ common multiples
✓ composite numbers
✓ multiplying by 10, 100 and 1000
✓ square
✓ squared
✓ cube
✓ cubed

Year 6 specific vocabulary:
✓ indices (powers)
✓ lowest common multiple
✓ brackets
✓ order of operations (BIDMAS)

Sentence stems

Year 5:

Common multiples
✓ Common multiples of given numbers are numbers that are in the times tables of both numbers.
✓ Common multiples of (number a) and (number b) are …

Composite numbers
✓ All numbers with more than two factors are composite numbers.

Prime numbers
✓ A prime number only has two factors, 1 and itself.

Multiplying by 1,000
✓ When multiplying by 1,000, the digits move three places to the left.
✓ When multiplying by 1,000, the number is 1,000 times bigger.

Square number
✓ A square number is made when you multiply a number by itself.
✓ (number) x (number) = (product), so (product) is a square number.
✓A square number always has an odd number of factors.

Cube number
✓ A cube number is made when you multiply a number by itself twice.
✓ (number) x (number) x (number) = (product), so (product) is a cube number.

Year 6:

Lowest common multiple
✓ The smallest common multiple of any given numbers is called the lowest common multiple (LCM).
✓ The LCM of (number) and (number) is (LCM).

Indices (powers)
✓ Indices show how many times to multiply a number by itself.
✓ For (number) squared, write (number)2. This is the same as (number) x (number).
✓ For (number) cubed, it is the same as (number) x (number) x (number). This can be read as (number) to the power of 3.

Bracket
✓ A bracket is used to tell us which part of an equation to do first according to BIDMAS.

BIDMAS
✓ BIDMAS tells us the order in which to complete a calculation. We do Brackets, Indices, Division & Multiplication, Addition and Subtraction.

Promote checking answers using the inverse operation.

National Curriculum Expectations

Multiplication

Formal written methods for calculation

Year 2

Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (x) and equals (=) signs

First formal methods for recording multiplication

6 x 5 = 30
5 x 6 = 30

8 x 2 = 16
2 x 8 = 16

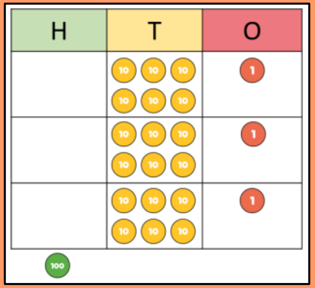
A deep understanding of the meaning of the multiplication through repeated addition will precede the introduction of these mathematical statements; the statements will also be represented through use of arrays and other concrete and pictorial representations.

Year 3

Multiply a 2-digit number by a 1-digit number using a formal written method.

Pupils practise becoming fluent in the formal written method of short multiplication *using the times tables they know.*

Use place value grids and counters as concrete and pictorial strategy.



61 x 3 = 183

```
  6 1
x   3
-----
1 8 3
```

14 x 5 = 70

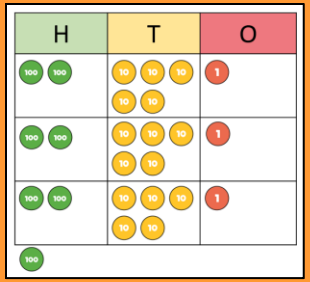
```
  1 4
x   5
-----
  7 0
  2
```

Year 4

Multiply 2-digit and 3-digit numbers by a 1-digit number using a formal written method.

Pupils practise their fluency in the formal written method of short multiplication using <u>*ALL*</u> times table facts.

Use place value grids and counters as concrete and pictorial strategy.



251 x 3 = 753

```
  2 5 1
x     3
-------
  7 5 3
  1
```

456 x 7 = 272

```
  4 5 6
x     7
-------
3 1 9 2
3 3 4
```

Year 5

Multiply numbers up to 4-digits by a 1 or 2-digit number using a formal written method, including long multiplication when multiplying by 2-digit numbers.

Short method: 4-digit x 1-digit

```
  1 2 3 4
  X     4
---------
  4 9 3 6
  1   1
```

Multiplying decimals (short method):

```
   3 . 4 4
x  6
----------
 2 0 . 6 4
 2     2
```

Long multiplication: 2-digit x 2-digit

```
    2 4
  x 1 6
  -----
  1 4 4
    2
+ 2 4 0
  -----
  3 8 4
```

Pupils practise their fluency in the formal written method of short multiplication using <u>*ALL*</u> times table facts.

Year 6

Multiply multi-digit numbers up to 4-digits by a 2-digit integer using the formal written method of long multiplication.

Multiply a 1-digit numbers with up to 2-decimal places by a 1-digit integer.

Long multiplication: 3-digit x 2-digit

```
      1 2 4
    x   2 6
    -------
      7 4 4
      1 2
  + 2 4 8 0
    -------
    3 2 2 4
    1 1
```

Long multiplication: 4-digit x 2-digit

```
        4 2 4 3
    x       3 2
    -----------
        8 4 8 6
  + 1 2 7 2 9 0
          1
    -----------
      1 3 5 7 7 6
      1   1
```

Pupils practise their fluency in the formal written method of short multiplication using <u>*ALL*</u> times table facts.

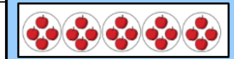
National Curriculum Expectations

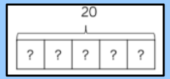
Division

NC expectations, Key Vocabulary and Oracy

Year 1

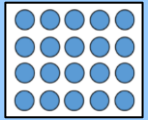
✓ solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher





Multiplicative reasoning in Year 1 and 2 – SHARING

There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?



Children solve problems by sharing amounts into equal groups.
In Year 1, children use concrete and pictorial representations to solve problems.
They are not expected to record division formally.

Vocabulary

✓ equal groups of
✓ equal lots of
✓ equal sets of
✓ grouping
✓ share equally
✓ sharing
✓ share
✓ half
✓ halves
✓ halving
✓ half as much/
✓ many as…
✓ arrays
✓ row
✓ column
✓ patterns

Sentence stems

Grouping
✓ One group of (number), two groups of (number), three groups of (number)…
✓ Each (item) can hold (number/ item). (number/ item) will need (number/ item).
✓ There are (number) equal groups of (number). There are (number) altogether.

Sharing
✓ One for you, one for you, one for you,…
✓ (number/ item) have been shared equally into (number) groups/ lots/sets.
✓ There are (number/ item) in each group/lot/set. OR each group/lot/set has (number/item).
✓ (number/ item) have not been shared equally between (number) groups/lots/ sets. There are not equal groups/lots/sets of (item).
✓ Share (number) equally between (number) groups. Each group has (number).

Array
✓ (number/ item) have been used to make this array. There are (number) rows of (number/ item).
✓ (number/ item) have been used to make this array. There are (number) columns of (number/ item).

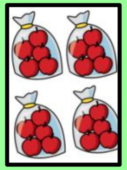
Half
✓ Half of (number) is (number).

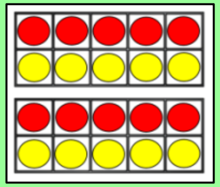
Year 2

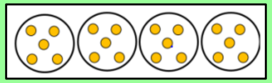
✓ recall and use division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
✓ calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
✓ show that division of one number by another cannot be done in any order
✓ solve problems involving division, using materials, arrays, repeated addition, mental methods, and division facts, including problems in context

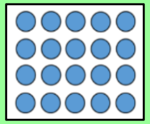
Multiplicative reasoning in Year 1 and 2 – GROUPING

There are 20 apples altogether. They are put into bags of 5. How many bags are there?









Vocabulary

✓ division
✓ divide
✓ divided by
✓ divided into
✓ repeated
✓ subtraction
✓ left over
✓ one each, two
✓ each, three each…
✓ ten each
✓ group in pairs,
✓ threes… tens
✓ multiple
✓ division facts
✓ commutative law
✓ commutativity
✓ calculation
✓ equation
✓ ÷
✓ =

Sentence stems

✓ Division is not commutative – you cannot swap the numbers around in the calculation/equation and reach the same answer.

Grouping
✓ (number a) can be put into groups of (number b). This is the same as (number a) being divided into groups of (number b), which equals (number c). This can be written as (number a) ÷ (number b) = (number c)
✓ (number a) divided by (number b) equals (number c).

Sharing
✓ (number a) can be shared equally between (number b) groups/lots/etc. This is the same as (number a) shared into (number b) groups/lots/set, which equals (number c). This can be written as (number a) ÷ (number b) = (number c)
✓ (number a) can be shared equally into (number b) groups/lots/sets because
✓ (number a) can be shared equally into (number b) groups because (number a) is a multiple of (number b).
✓ (number a) cannot be shared into (number b) groups/lots/sets because there is/are(number c) left over.

Division

NC expectations, Key Vocabulary and Oracy

National Curriculum Expectations

Year 3

✓ recall and use division facts for the 3, 4 and 8 multiplication tables
✓ write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
✓ solve problems, including missing number problems, involving division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Year 4

✓ recall division facts for multiplication tables up to 12 × 12
✓ use place value, known and derived facts to divide mentally, including:

- dividing by 1

Year 5 and Year 6

Year 5:

✓ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
✓ know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
✓ establish whether a number up to 100 is prime and recall prime numbers up to 19
✓ divide numbers mentally drawing upon known facts
✓ 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
✓ divide whole numbers and those involving decimals by 10, 100 and 1000
✓ recognise and use square numbers and cube numbers, and the notation for squared(^{2}) and cubed (^{3})
✓ solve problems involving division including using their knowledge of factors and multiples, squares and cubes
✓ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
✓ solve problems involving division, including scaling by simple fractions and problems involving simple rates

Year 6:

✓ divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
✓ divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
✓ perform mental calculations, including with mixed operations and large numbers
✓ identify common factors, common multiples and prime numbers
✓ use their knowledge of the order of operations to carry out calculations involving the four operations
✓ solve problems involving addition, subtraction, multiplication and division
✓ use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Year 3

Vocabulary

✓ threes
✓ fours
✓ eights
✓ product
✓ remainder
✓ short division
✓ scaling (integer)
✓ quarter
✓ third
✓ eighth

Sentence stems

Using known facts
✓ I know that (number a) ÷ (number b) = (number c) because (number c) × (number b) = (number a)
✓ (number a) ÷ (number b) = ?, this means ? x (number b) = (number a)
✓ If (number a) x (number b) = (number c), then (number c) tens ÷ (number b) = (number a) tens, so (number c x 10) ÷ (number b) = (number a x 10).
✓ If (number a) ÷ (number b) = (number c), then (number a) tens ÷ (number b) = (number c) tens, so (number a x 10) ÷ (number b) = (number c x 10)

Divide by 4 and 8
✓ To divide a number by 4, I can half the number and half the answer.
✓ To find a quarter of something is the same as dividing by 4.
✓ To divide something by 8, I can halve, halve and halve again.

Remainder
✓ (number a) is not in the (number b) times tables; when you divide (number a) by (number b) there is a remainder of (number c).

Year 4

Vocabulary

✓ inverse
✓ dividend
✓ divisor
✓ quotient
✓ divisible by
✓ dividing by 10, 100
✓ factor
✓ factor pair

Sentence stems

✓ The dividend is the number you are dividing.
✓ The divisor is the number you are dividing by.
✓ The quotient is the answer to a division fact.

Factor/Factor pairs and multiples
✓ (number a) ÷ (number b) = (number c), so (number b) and (number c) are factors of (number a).
✓ The product of (number a) and (number b) is (number c), so (number a) and (number b) are a factor pair of (number c)
✓ (number a) is a multiple of both (number b) and (number c).

Inverse
✓ I know that (number a) ÷ (number b) = (number c) because (number b/c) x (number c/b) = (number a).

Dividing by 10, 100
✓ When dividing by (10 or 100), the number is being split into (10 or 100) equal parts. The number is (10 or 100) times smaller.
✓ When dividing by 10, we move the digits one place to the right.
✓ When dividing by 100, we move the digits two places to the right.
✓ There are (number) tens in (number).

Divide by 1
✓ Dividing anything by 1 gives the same number as this is just one group of anything.

Year 5 and Year 6

Vocabulary

✓ common factors
✓ prime
✓ prime factors
✓ composite numbers
✓ dividing by 10, 100 and 1,000

Year 6 specific vocabulary:

✓ indices (powers)
✓ lowest common multiple
✓ brackets
✓ order of operations (BIDMAS)

Sentence stems

Year 5:

Divisible by
✓ (number a) is a multiple of (number b) This means that (number a) is divisible by (n
✓ (number a) is divisible by (number b) because (number b) x (number c) = (number

Common factors
✓ The factors of (number a) are…
✓ The factors of (number b) are…
✓ The common factors of (number a) and (number b) are…

Composite numbers
✓ A composite number is not prime, it has more than two factors.

Dividing by 1,000
✓ When dividing by 1,000, the digits move three places to the right.
✓ When dividing by 1,000, the number is 1,000 times smaller.

Year 6:

Highest common factor
✓ The highest common factor (HCF) is the largest common factor of given numbers.
✓ The common factors of (number) and (number) are … – the HCF is (number).

Bracket
✓ A bracket is used to tell us which part of an equation to do first according to BIDMAS.

BIDMAS
✓ BIDMAS tells us the order in which to complete a calculation. We do Brackets, Indices, Division & Multiplication, Addition and Subtraction.

Formal written methods for calculation

Division

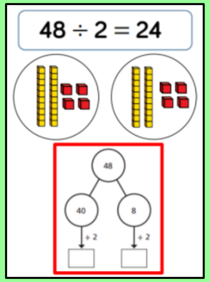
National Curriculum Expectations

Year 2

Calculate mathematical statements for division within the multiplication tables and write them using the signs ÷ and =

6 ÷ 2 = 3
20 ÷ 5 = 4
18 ÷ 2 = 9

Dividing 2-digits by 1-digit:



When dividing larger numbers, children can use manipulatives to allow them to partition into tens and ones. Base 10 can be used to share numbers into equal groups. Part-whole models provide children with a clear written method that matches the concrete representation.

Year 3

Write and calculate mathematical statements for division using the multiplication tables that pupils know, including for 2 digit numbers times 1 digit numbers.
Pupils develop reliable written methods for division starting with calculations of 2 digit by 1 digit and progression to the formal written methods of short division.

Use place value grids and counters as concrete and pictorial strategy.

2-digit divided by 1-digit:

52 ÷ 4 = 13

```
    1 3
4 | 5 ¹2
```

2-digit divided by 1-digit with remainders:

53 ÷ 4 = 13 r. 1

```
    1 3 r. 1
4 | 5 ¹3
```

Year 4

Pupils practise to become fluent in the formal written method of short division with exact answers.

Children can continue to use place value counters to share 3-digit numbers into equal groups. Children should start with the equipment outside the place value grid before sharing the hundreds, tens and ones equally between the rows. This method can also help to highlight any remainders.

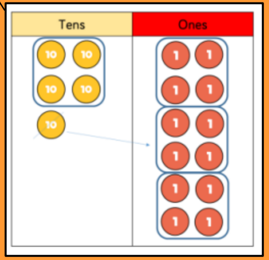
3-digit divided by 1-digit (sharing):

844 ÷ 4 = 211

```
   2 1 1
4 | 8 4 4
```

Grouping:

When using the short division method, children use grouping. Starting with the largest place value, they group by the divisor.
Language is important here and children should consider 'How may groups of 4 tens can we make?' and 'How many groups of 4 ones can we make?'
Remainders can also be seen as they left ungrouped.

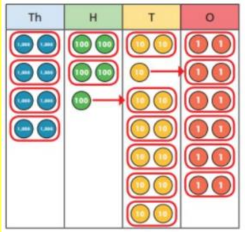


Year 5

Divide numbers up to 4 digits by a 1 digit number using the formal written method of short division and interpret remainders appropriately for the context.

4-digit divided by 1-digit (grouping)

Place value counters can be used to support understanding but should be moved away from when multiple exchanges are required.



8,532 ÷ 2 = 4,266

```
   4 2 6 6
2 | 8 5 ¹3 ¹2
```

Short method that will have a decimal remainder:

e.g. £456 ÷ 5 = £91.20

```
   0 9 1 . 2
5 | 4 ⁴5 6 . ¹0
```

Additional place holder for the quotient as money always has 2 decimal places.

Year 6

Divide numbers up to 4 digits by a 2 digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.

Divide numbers up to 4 digits by a 2 digit number using the formal written method of short division where appropriate, interpreting remainders according to the context.

Pupils are introduced to the division of decimal numbers by 1 digit whole number, initially, in practical contexts involving measures and money.

Long division 4-digit divided by 2-digit:

Pupils begin by gathering partitioned multiples.

4832 ÷ 15 = 322 r 2

10	+	5	=	15
20	+	10	=	30
30	+	15	=	45
40	+	20	=	60
50	+	25	=	75
60	+	30	=	90
70	+	35	=	105
80	+	40	=	120
90	+	45	=	135

```
     0 3 2 2 r. 2
1 5 | 4 8 3 2
    - 4 5
        3 3
      - 3 0
          3 2
        - 3 0
            2
```

Short division 4-digit divided by 2-digit:

Pupils gather partitioned multiples first.

4268 ÷ 22 = 194

```
     0 1 9 4
2 2 | 4 ⁴2 ²⁰6 ⁸8
```

Decimal by single digit:

267.75 ÷ 5 = 53.55

```
   0 5 3 . 5 5
5 | 2 ²6 ¹7 . ²7 ²5
```

Whole number by single digit with decimal quotient:

10 ÷ 8 = 1.25

```
   1 . 2 5
8 | 1 ¹0 . ²0 ⁴0
```

Additional *place holders* required