Queensgate Foundation Primary School

Calculation Policy
February 2025

Policy Review

This policy was adopted 4th April 2019 and will be reviewed in full by the Governing Body on an annual basis.

The policy was last reviewed and agreed by the Governing Body on 3rd February 2025.

It is due for review on February 2026 (up to 36 months from the above date).

Signature: ~~Sillito~~   Head Teacher   Date: 3rd February 2025

Signature: Co-Chair of Governors   Date: 3rd February 2025

Policy control

Date	Amendments / additions	Reason
Jan 2025	Added policy control section	Missing from policy
Jan 2025	Year 2 Multiplication & Division – Page 26	Calculation error corrected

Working together for a successful future

Mathematics

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.

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.

ELG: Numerical Patterns

Children at the expected level of development will:

- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Calculation Policy – EYFS / Foundation Stage

ELG: Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Counting

- Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.

Oral counting

Oral counting in 1s forwards and backwards to 10 then 20 **starting at zero.** 0,1,2,3 etc

Progress to **starting at any number** and counting in 1s. 5, 6, 7 (important if children are able to count on later.

Oral counting- Saying **teen and ty** numbers correctly.

e.g. 13- thirteen, 30- thirty.

> 40-60 months
> Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.

Object counting

Counting all- 1:1 principle (1:1 correspondence)

Counting objects up to 10 then 20.

Children need to understand that number labels (words) match objects as they count them.

🍎 🍎 🍎 3

One, two, three

Place Value and Number System

- Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer

Subitising

Children should start to recognise small amounts without counting, especially when presented with familiar arrangements e.g. numicon and dice.

Number conservation

Children should have opportunities to explore groups of objects and note that when some are moved there is still the same quantity there (unless any are removed or added).

How many counters?

🔵 🔵 🔵   🔵 🔵
How many now?   🔵

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The learning environment

A number rich environment

Multi-representation of numbers to 20

Activities to promote multi-representation through play/exploration.

In your writing area– have you got prompts to encourage children to write their numbers and mark make in maths?

40-60 months
- Counts up to three or four objects by saying one number name for each item.
- Counts actions or objects which cannot be moved.
- Counts objects to 10, and beginning to count beyond 10.
- Counts an irregular arrangement of up to ten objects.
- Counts out up to six objects from a larger group.
- Counts an irregular arrangement of up to ten objects.

Children need opportunities to make links with number labels (figures), object counting and ordering numbers.

Place Value and Number System

Ordering numbers

Ordering a set of consecutive numbers e.g.

| 5 | 6 | 7 | 8 | 9 |

Ordering a set of random numbers e.g.

| 2 | 5 | 6 | 7 | 9 |

| 6 | 19 | 11 | 5 | 15 |
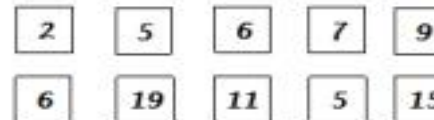
Using comparative language to describe group size

Which group has more/fewer?

Which has most/least?

40-60 months
Uses the language of 'more' and 'fewer' to compare two sets of objects.

There are fewer apples/less apples than oranges.

There are more oranges than apples.

There are most oranges.

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Addition

Aggregation– combining groups

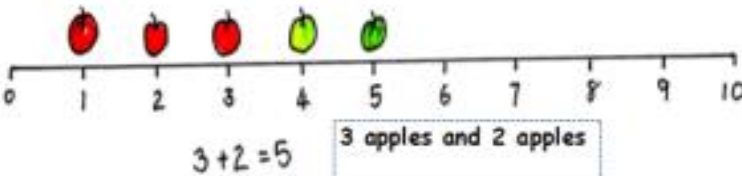Counting all, 1, 2, 3, 4, 5   There are 5 apples

2 apples   3 apples

Structured Number Lines

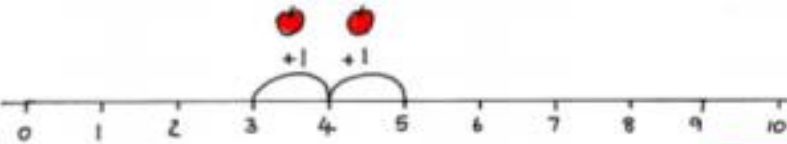Counting on from first number 2, 3, 4, 5 There are 5 apples

Counting on from the greatest number. 3, 4, 5
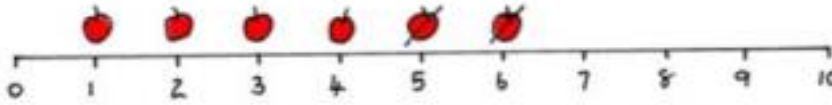
$3+2=5$

3 apples and 2 apples

$3+2=5$
3apples and 2 apples, 5 apples altogether.

Subtraction

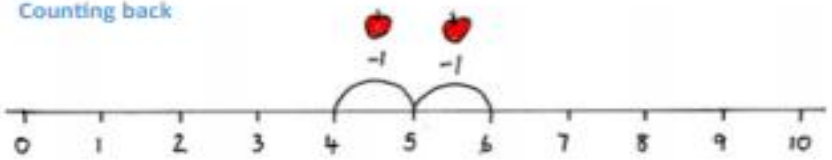**Taking away– removing objects from a group**

I have 6 apples. I eat 2 apples. How many are left?

Count out 6, take away 2, count how many are left?

$6-2=4$

Counting back

$6-2=4$

6 apples take away 2 apples, leaves 4 apples.

40-60 months
- Finds one more or one less from a group of up to five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.
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Exploring relationships (inverse)

Bar Modelling

Part, part, whole models

40– 60 months
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.

The whole is 5.

3 is a part, 2 is a part of the whole.

If you remove 1 part, the other is left. E.g. $5 - 3 = 2$ or $5 - 2 = 3$

If you put the parts together, you get the whole.

$3 + 2 = 5$ $2 + 3 = 5$ These are commutative .

What is the same? What is different?

Mary had 7 letters in her bag and she posted 3. How many did she have left?

$7 - 3 = ?$

Mary had 7 letters in her bag and after she posted some, she had 4 left. How many did she post?

$7 - ? = 4$

Mary had some letters and after posting 3, she had 4 left. How many did she start with?

$? - 3 = 4$

Act out problems in different ways

Year 1
- Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = ? - 9$

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The EYFS Framework

Mathematics involves providing children with opportunities to develop and improve their skills in counting, understanding and using numbers, calculating simple addition and subtraction problems; and to describe shapes, spaces, and measures

Early Learning Goals

Mathematics Numbers: children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Shape, space and measures: children use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems. They recognise, create and describe patterns. They explore characteristics of everyday objects and shapes and use mathematical language to describe them.

Additional Guidance can be found in Development Matters.

https://www.early-education.org.uk/development-matters

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ELG: Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

Each day Jack's beanstalk doubled in height. It was twice as tall.

Today it is 3 bricks tall. How tall will it be tomorrow?
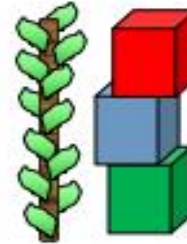
ELG

They solve problems, including doubling, halving and sharing.

Cut the food in half to share with a friend.

3 friends wanted to share the last 6 apples. To make it fair they need the same amount each.

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Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

National Curriculum 2014

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Pupils should be taught to:

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number

- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens

- given a number, identify one more and one less

- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

read and write numbers from 1 to 20 in numerals and words.

Notes and guidance (non-statutory)

Pupils practise counting (1, 2, 3…), ordering (for example, first, second, third…), and to indicate a quantity (for example, 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.

Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.

They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system (for example, odd and even numbers), including varied and frequent practice through increasingly complex questions.

They recognise and create repeating patterns with objects and with shapes.

Concentrate on the tricky areas e.g. bridging through 100.

97, 98, 99, 100, 101, 102

Remember to count backwards as frequently as you count on!

Ordering numbers

Which numbers are covered?

Give me a number between… and… .
How do you know?

Number formation

Stencils, dot to dot, tracing, writing in sand, making numbers from modelling dough, using different pens.

Pupils should be taught to:

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward

- recognise the place value of each digit in a two-digit number (tens, ones)

- identify, represent and estimate numbers using different representations, including the number line

- compare and order numbers from 0 up to 100; use <, > and = signs

- read and write numbers to at least 100 in numerals and in words

use place value and number facts to solve problems.

Notes and guidance (non-statutory)

Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.

As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.

Pupils should partition numbers in different ways (for example, 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.

What has changed? Stayed the same?

13, 23, 33

+ 10
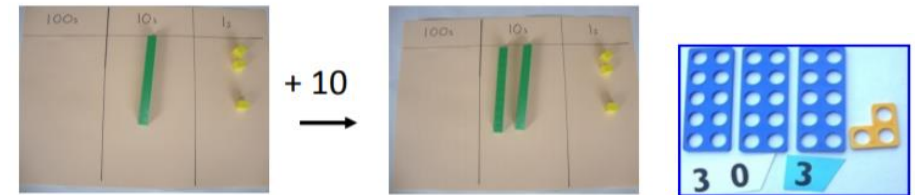
Ordering numbers

Order consecutive and random numbers to 100.

| 46 | 63 | 72 | 85 | 100 |
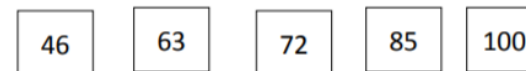
33 can be partitioned in different ways

| 33 = 30 + 3 |
| 33 = 20 + 13 |

20   10 + 3
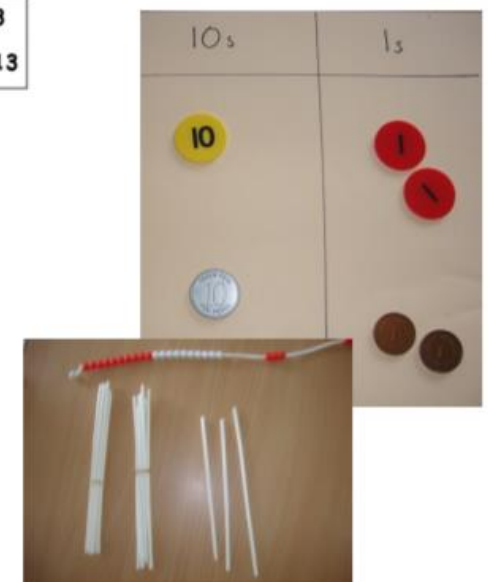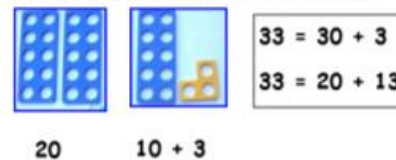
Calculation Policy – Key Stage 1: Year 1: Addition & Subtraction

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
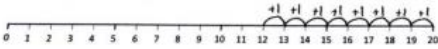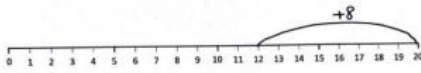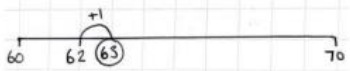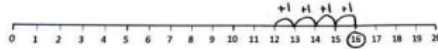- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ - 9
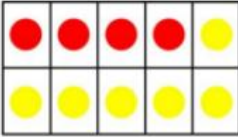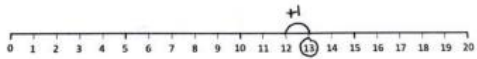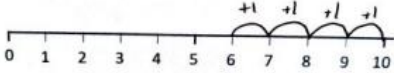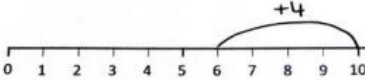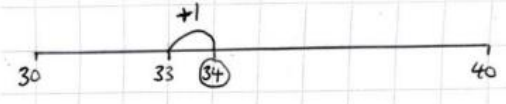
Notes and guidance (non-statutory)
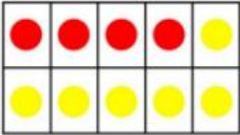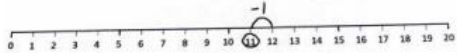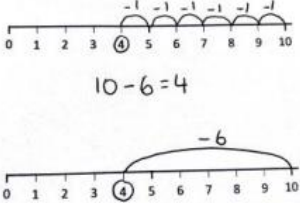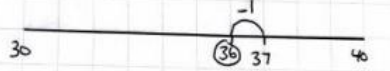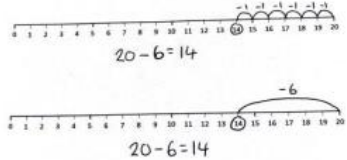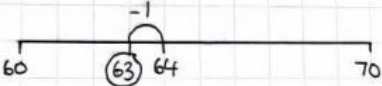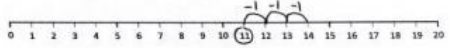
Pupils memorise and reason with number bonds to 10 and 20 in several forms (for example, 9 + 7 = 16; 16 – 7 = 9; 7 = 16 – 9). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.

Pupils combine and increase numbers, counting forwards and backwards.

They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

Stage 1	Stage 2	End of Year Expectation
Represent number bonds within 10.	Use number bonds within 10.	Represent and use number bonds within 20.

Stage 1

Represent number bonds within 10.

$$4 + 6 = 10$$

Find 1 more from any given number within 20.

$$12 + 1 = 13$$

Stage 2

Use number bonds within 10.

$$6 + 4 = 10$$

$$6 + 4 = 10$$

Find 1 more from any given number within 50.

End of Year Expectation

Represent and use number bonds within 20.

$$12 + 8 = 20$$

$$12 + 8 = 20$$

Find 1 more from any given number within 100.

Add 1-digit and 2-digit numbers to 20.

$$12 + 4 = 16$$

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Stage 1	Stage 2	End of Year Expectation
Represent number bonds within 10.	Use number bonds within 10.	Represent and use number bonds within 20.

$$10 - 6 = 4$$

Stage 2:

$$10 - 6 = 4$$

$$10 - 6 = 4$$

End of Year Expectation:

$$20 - 6 = 14$$

$$20 - 6 = 14$$

Find 1 less from any given number within 20.

$$12 - 1 = 11$$

Find 1 less from any given number within 50.

$$37 - 1 = 36$$

Find 1 less from any given number within 100.

$$64 - 1 = 63$$

Subtract 1-digit and 2-digit numbers within 20.

$$14 - 3 = 11$$

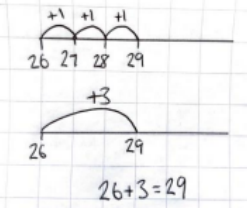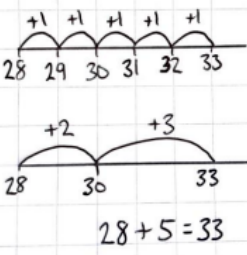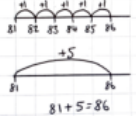Calculation Policy – Key Stage 1: Year 2: Addition & Subtraction

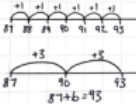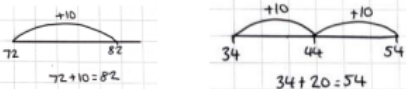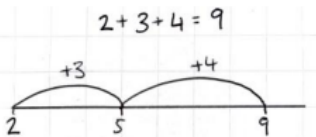Pupils should be taught to:
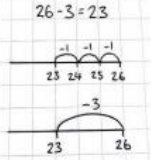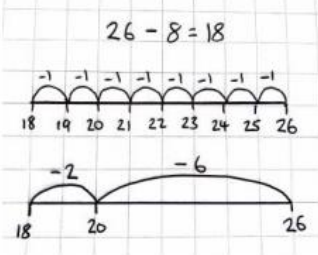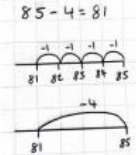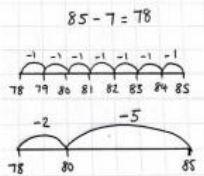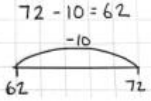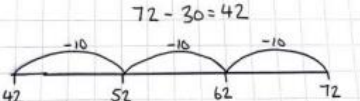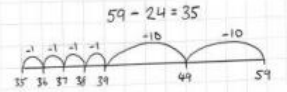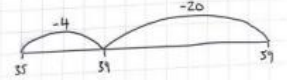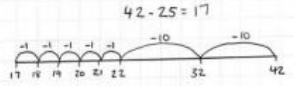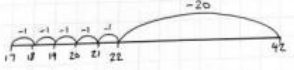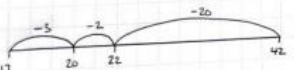
- solve problems with addition and subtraction:
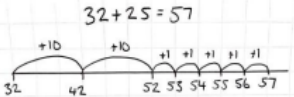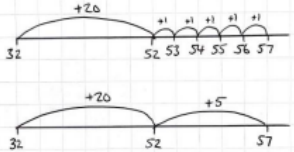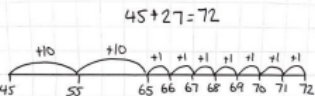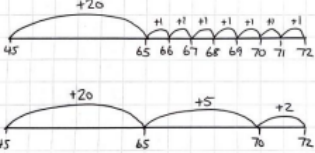   - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
    - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and 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
    - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Notes and guidance (non-statutory)

Pupils extend their understanding of the language of addition and subtraction to include sum and difference. Pupils practise addition and subtraction to 20 to become increasingly fluent in deriving facts such as using $3 + 7 = 10$; $10 − 7 = 3$ and $7 = 10 − 3$ to calculate $30 + 70 = 100$; $100 − 70 = 30$ and $70 = 100 − 30$. They check their calculations, including by adding to check subtraction and adding numbers in a different order to check addition (for example, $5 + 2 + 1 = 1 + 5 + 2 = 1 + 2 + 5$). This establishes commutativity and associativity of addition.

Recording addition and subtraction in columns supports place value and prepares for formal written methods with larger numbers.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Add 2-digit numbers and ones to 50 without bridging.	Add 2-digit numbers and ones to 100 without bridging.	Adding two 2-digit numbers without bridging.

Stage 1:

Add 2-digit numbers and ones to 50 without bridging.

+1 +1 +1
26 27 28 29

+3
26   29

26+3=29

Add 2-digit numbers and ones to 50 with bridging.

+1 +1 +1 +1 +1
28 29 30 31 32 33

+2   +3
28   30   33

28 + 5 = 33

Stage 2:

Add 2-digit numbers and ones to 100 without bridging.

+1 +1 +1 +1 +1
81 82 83 84 85 86

+5
81   86
81+5=86

Add 2-digit numbers and ones to 100 with bridging.

+1 +1 +1 +1 +1 +1
87 88 89 90 91 92 93

+3   +3
87   90   93
87+6=93

Add 2-digit and tens.

+10
72   82
72+10=82

+10   +10
34   44   54
34+20=54

Adding three 1-digit numbers.

2+3+4 = 9

+3   +4
2   5   9

End of Year Expectation:

Adding two 2-digit numbers without bridging.

32+25 = 57

+10   +10   +1 +1 +1 +1 +1
32   42   52 53 54 55 56 57

+20
32   52 53 54 55 56 57

+20   +5
32   52   57

Adding two 2-digit numbers with bridging.

45+27=72

+10   +10   +1 +1 +1 +1 +1 +1 +1
45   55   65 66 67 68 69 70 71 72

+20   +1 +1 +1 +1 +1 +1 +1
45   65 66 67 68 69 70 71 72

+20   +5   +2
45   65   70   72

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Subtract 2-digit numbers and ones with numbers to 50 without bridging.	Subtract 2-digit numbers and ones to 100 without bridging.	Subtract two 2-digit numbers without bridging.
$26 - 3 = 23$	$85 - 4 = 81$	$59 - 24 = 35$
Subtract 2-digit numbers and ones to 50 with bridging.	Subtract 2-digit numbers and ones to 100 with bridging.	Subtract two 2-digit numbers with bridging.
$26 - 8 = 18$	$85 - 7 = 78$	$42 - 25 = 17$
	Subtract 2-digit numbers and tens.	
	$72 - 10 = 62$ $72 - 30 = 42$	

Working together for a successful future

Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources [for example, concrete objects and measuring tools].

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

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Calculation Policy – Key Stage 1: Year 1: Multiplication & Division

Pupils should be taught to:
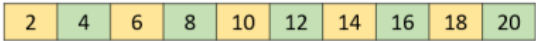
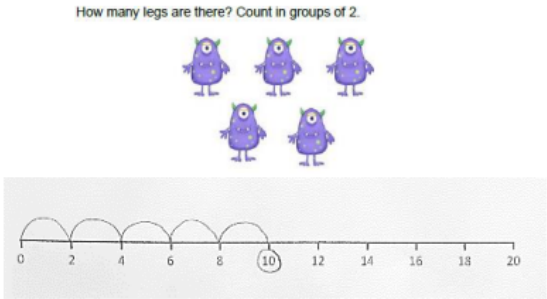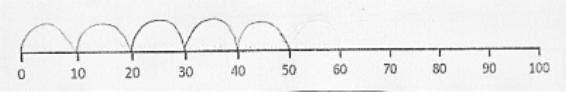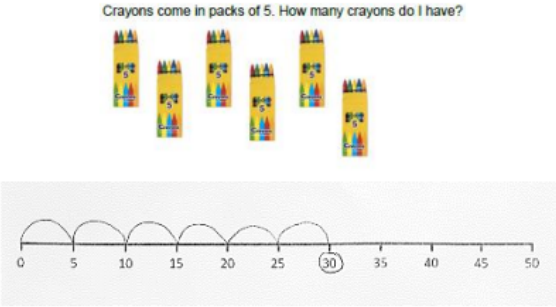Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Notes and guidance (non-statutory)
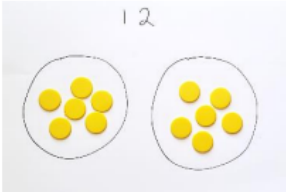
Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens.

Working together for a successful future

Please note that manipulatives and visual representations may be used alongside more formal recording as appropriate. It is important for pupils to explore structure and understand a concept before developing a more procedural approach, at which point all representations may be used alongside each other.

Stage 1	Stage 2	End of Year Expectation
Count in multiples of twos Number track	**Count in multiples of tens** Number track	**Count in multiples of fives** Number track

Stage 1 number track: 2 4 6 8 10 12 14 16 18 20

Stage 2 number track: 10 20 30 40 50 60 70 80 90 100

End of Year number track: 5 10 15 20 25 30 35 40 45 50

Stage 1

Solve one step multiplication, by calculating the answer using pictorial representations (twos)

Structured number line, e.g:

How many legs are there? Count in groups of 2.

Stage 2

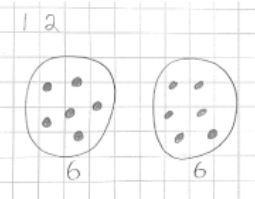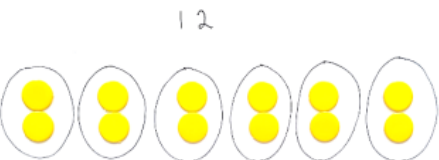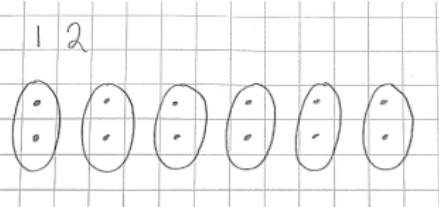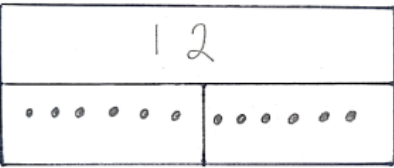**Solve one step multiplication, by calculating the answer using pictorial representations (tens).**

Structured number line, e.g:

There are 10 crayons in a box.

How many crayons will I have if I buy 5 boxes?

End of Year Expectation

Solve one step multiplication, by calculating the answer using pictorial representations (fives).

Structured number line, e.g:

Crayons come in packs of 5. How many crayons do I have?

Working together for a successful future

Please note that manipulatives and visual representations may be used alongside more formal recording as appropriate. It is important for pupils to explore structure and understand a concept before developing a more procedural approach, at which point all representations may be used alongside each other.

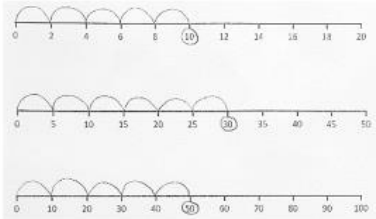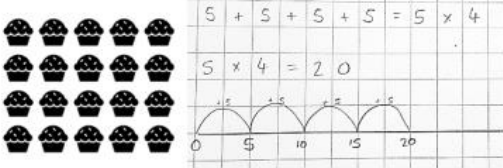| Stage 1	Stage 2	End of Year Expectation
Making equal groups – sharing.	**Making equal groups – grouping.**	**Making equal groups (including finding half of a quantity).**
Concrete objects and pictorial representations, e.g:	Concrete objects and pictorial representations, e.g:	Bar models, e.g:
I have 12 sweets and share them between myself and a friend (2 people), how many will we each have?	*I have 12 cookies to put in bags.* *If I put 2 in each bag how many bags will I need?*	*I had 12 grapes and I ate half. How many are left?*
"If I share **12** equally between **2** groups, there will be **6** in each group."	"There are **12** altogether. There are **6** equal groups of **2**."	"There are **12** altogether. They are shared into **2** equal groups. There are **6** in each group. Each group is half of the whole. I know that there are **6** grapes left."

Working together for a successful future
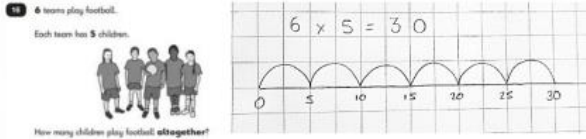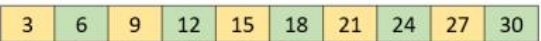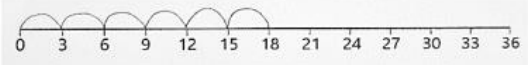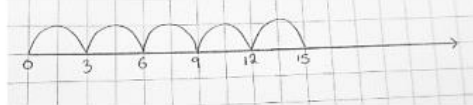
Calculation Policy – Key Stage 1: Year 2: Multiplication & Division

Pupils should be taught to:
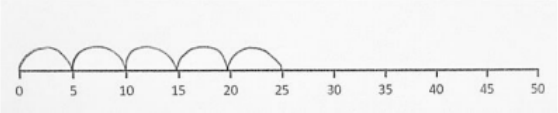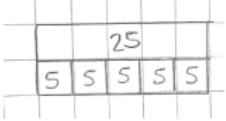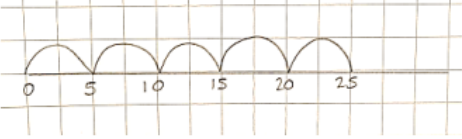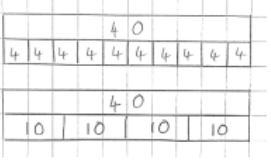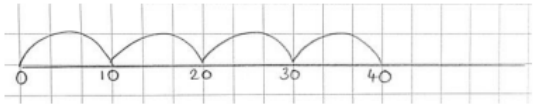
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers

- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs

- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot

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

Please note that manipulatives and visual representations may be used alongside more formal recording as appropriate. It is important for pupils to explore structure and understand a concept before developing a more procedural approach, at which point all representations may be used alongside each other.

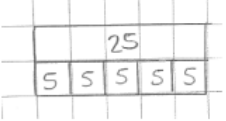| Stage 1	Stage 2	End of Year Expectation
Count in steps of two, five from 0 and in tens from any number, forward and backward. Structured number line.	**Solve problems involving multiplication using repeated addition.** Unstructured number line, e.g *How many muffins are there altogether?*	**Recall and use multiplication facts for the 2, 5 and 10 multiplication tables.** Unstructured number line to 'prove it' 'Contains KS1 SATs materials licensed under Open Government Licence v3.0 Open Government Licence (nationalarchives.gov.uk)
Count in steps of 3. Number track	**Count in steps of 3.** Structured number line, e.g. *Tilly ran 3 miles every day. How many miles has she run after 6 days?*	**Count in steps of 3.** Unstructured number line

Working together for a successful future

Please note that manipulatives and visual representations may be used alongside more formal recording as appropriate. It is important for pupils to explore structure and understand a concept before developing a more procedural approach, at which point all representations may be used alongside each other.		
Stage 1	**Stage 2**	**End of Year Expectation**
Count on in steps of two, three and five from 0. Skip counting on a structured number line, e.g: $$25 \div 5 = \Box$$ $$25 \div 5 = 5$$ Bar model representation:	**Count on in steps of two, three and five from 0.** Skip counting on an unstructured number line, e.g: $$25 \div 5 = \Box$$ $$25 \div 5 = 5$$ Bar model representation:	**Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables.** Number line or bar model to 'prove it' Ben has **40** cards. He shares them equally between **4** party bags. How many cards does he put in each bag? 'Contains KS1 SATs materials licensed under Open Government Licence v3.0 Open Government Licence (nationalarchives.gov.uk) "If I know that 4 x 10 = 40, then I know 40 ÷ 4 = 10".

Working together for a successful future

Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

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Pupils should be taught to:

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number

- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)

- compare and order numbers up to 1000

- identify, represent and estimate numbers using different representations

- read and write numbers up to 1000 in numerals and in words

- solve number problems and practical problems involving these ideas

Notes and guidance (non-statutory)

Pupils now use multiples of 2, 3, 4, 5, 8, 10, 50 and 100.

They use larger numbers to at least 1000, applying partitioning related to place value using varied and increasingly complex problems, building on work in year 2 (for example, 146 = 100 + 40 and 6, 146 = 130 + 16).

Using a variety of representations, including those related to measure, pupils continue to count in ones, tens and hundreds, so that they become fluent in the order and place value of numbers to 1000.

> 1136

Prove it. How do you know? Show me.

What is the same/different about the numbers?

$$340 - 20 = 360 - \square$$

Pupils should be taught to
- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value

Notes and guidance (non-statutory)

Using a variety of representations, including measures, pupils become fluent in the order and place value of numbers beyond 1000, including counting in tens and hundreds, and maintaining fluency in other multiples through varied and frequent practice.

They begin to extend their knowledge of the number system to include the decimal numbers and fractions that they have met so far.

They connect estimation and rounding numbers to the use of measuring instruments.

Roman numerals should be put in their historical context so pupils understand that there have been different ways to write whole numbers and that the important concepts of zero and place value were introduced over a period of time.

What is the same/different about the numbers?

$$340 - 20 = 360 - \square$$

What is the same/different about the numbers?
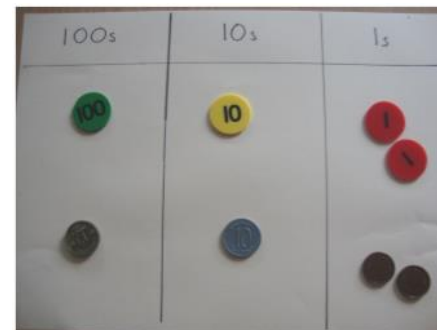
$$340 - 20 = 360 - \square$$

What is the same/different about the numbers?

$$340 - 20 = 360 - \square$$

Upper Key Stage 2

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.

Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.
Pupils should read, spell and pronounce mathematical vocabulary correctly.

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Pupils should be taught to:

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000

- solve number problems and practical problems that involve all of the above

- read Roman numerals to 1000 (M) and recognise years written in Roman numerals
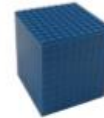
Notes and guidance (non-statutory)

Pupils identify the place value in large whole numbers.

They continue to use number in context, including measurement. Pupils extend and apply their understanding of the number system to the decimal numbers and fractions that they have met so far.
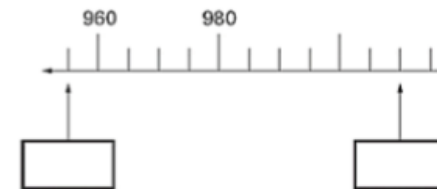
They should recognise and describe linear number sequences, including those involving fractions and decimals, and find the term-to-term rule.

They should recognise and describe linear number sequences (for example, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$ ...), including those involving fractions and decimals, and find the term-to-term rule in words (for example, add $\frac{1}{2}$).

How many of these would make a million?

Think about how you would record it?

960   980

Read the numbers on the scale.

Which number is between... and ...?

Where would 4250 be approximately?

Planet	Diameter km
Mercury	4878
Venus	12104
Earth	12756
Mars	6787
Jupiter	142796
Saturn	120660
Uranus	51118
Neptune	48600
Pluto	2274

Order the planet sizes from smallest to largest

Make a scale model

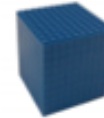| Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
M	Hth	TTh	Th	H	T	O ● t		h	th

. Pupils should be taught to:

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit

- round any whole number to a required degree of accuracy

- use negative numbers in context, and calculate intervals across zero

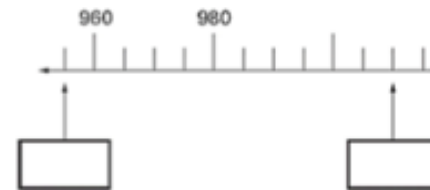- solve number and practical problems that involve all of the above

Notes and guidance (non-statutory)

Pupils use the whole number system, including saying, reading and writing numbers accurately.

How many of these would make a million?

Think about how you would record it?

960   980

Read the numbers on the scale.

Which number is between… and …?

Where would 4250 be approximately?

Planet	Diameter km
Mercury	4878
Venus	12104
Earth	12756
Mars	6787
Jupiter	142796
Saturn	120660
Uranus	51118
Neptune	48600
Pluto	2274

Order the planet sizes from smallest to largest

Make a scale model

Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths
M	Hth	TTh	Th	H	T	O ● t		h	th

Working together for a successful future

Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

National Curriculum 2014

Working together for a successful future

Calculation Policy – Year 3: Addition & Subtraction

Pupils should be taught to:
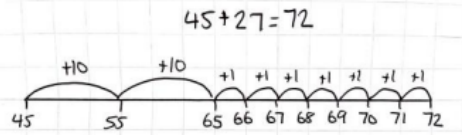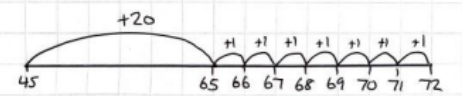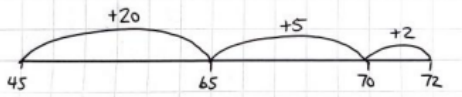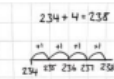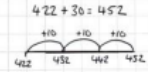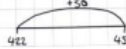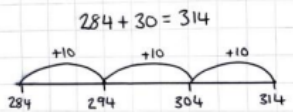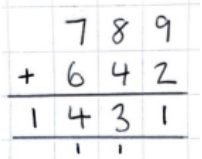
- add and subtract numbers mentally, including:
   - a three-digit number and ones
    - a three-digit number and tens
    - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
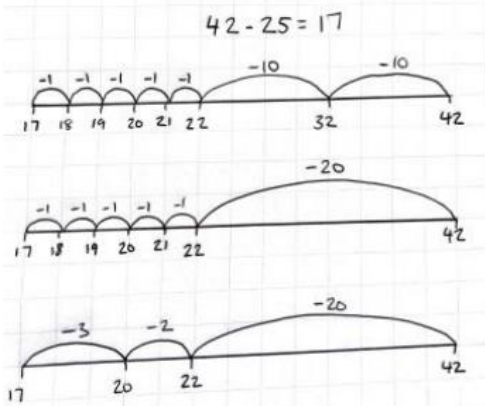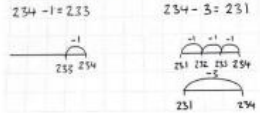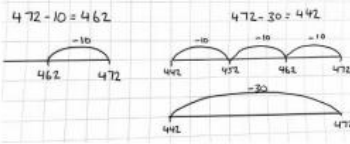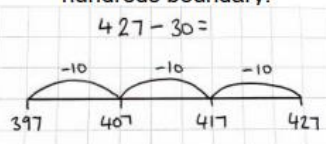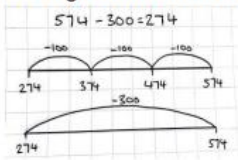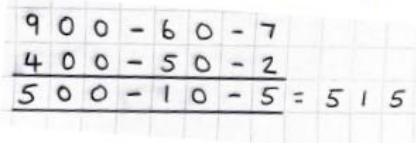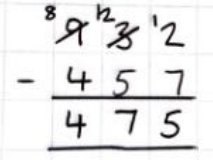
solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

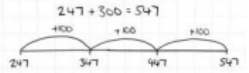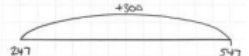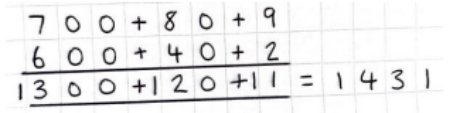Notes & Guidance (non-statutory)

Pupils practise solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.

Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Adding two 2-digit numbers with bridging.	**Adding a 3-digit number and ones.**	**Introduce column addition with numbers up to 3-digits.**
$45 + 27 = 72$	$234 + 1 = 235$ $234 + 4 = 238$	*Ensure number sentences chosen would not be more suited to a more efficient mental strategy.*
	Adding 3-digit and tens.	**Begin with expanded.**
	$422 + 10 = 432$ $422 + 30 = 452$	$700 + 80 + 9$
		$600 + 40 + 2$
	Adding a 3-digit number and tens crossing the hundreds boundary.	$1300 + 120 + 11 = 1431$
	$284 + 30 = 314$	**Then progress to compact.**
	Adding a 3-digit number and hundreds.	
	$247 + 300 = 547$	

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Subtract two 2-digit numbers with bridging.	Subtract a 3-digit number and ones.	Introduce column subtraction with numbers up to 3-digits.

Stage 1: Subtract two 2-digit numbers with bridging. $42 - 25 = 17$

Stage 2:
- Subtract a 3-digit number and ones. $234 - 1 = 233$ $234 - 3 = 231$
- Subtract a 3-digit number and tens. $472 - 10 = 462$ $472 - 30 = 442$
- Subtract a 3-digit number and tens crossing the hundreds boundary. $427 - 30 =$
- Subtract a 3-digit number and hundreds. $574 - 300 = 274$

End of Year Expectation:

Introduce column subtraction with numbers up to 3-digits.

Ensure number sentences chosen would not be more suited to a more efficient mental strategy.

Begin with expanded (without carrying).

$$900 - 60 - 7$$
$$400 - 50 - 2$$
$$500 - 10 - 5 = 515$$

Progress to compact (without carrying then with carrying).

$$\begin{array}{r} ^8\cancel{9}\,^{12}\cancel{8}\,^1 2 \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Working together for a successful future

Calculation Policy – Year 4: Addition & Subtraction

Pupils should be taught to:
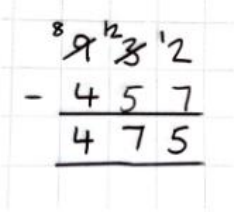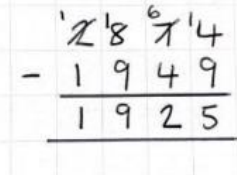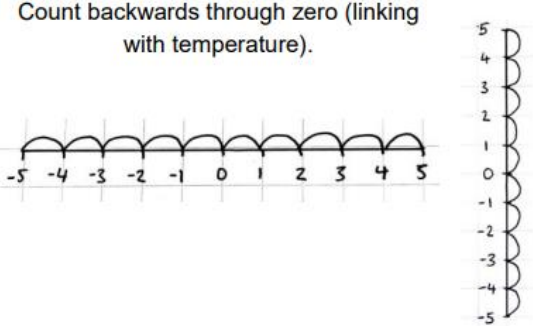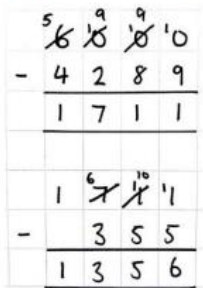
- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate

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

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

Notes & Guidance (non-statutory)

Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Column addition with numbers up to 3-digits.	Column addition with numbers up to 4-digits.	Multistep problem in context involving addition.
Ensure number sentences chosen would not be more suited to an efficient strategy.	*Ensure number sentences chosen would not be more suited to an efficient strategy.*	*(Provide a mixture of opportunities to apply mental and formal strategies taught)*

Stage 1

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

Stage 2

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

End of Year Expectation

Some children vote for their favourite ice-cream flavour.

Ice-cream flavour	Number of children
vanilla	87
chocolate	154
strawberry	?
mint	38
Total	402

How many children vote for **strawberry**?

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

```
   3   9
   4 ⁄0 ¹2
 -   2 7 9
   -------
   1 2 3
```

Strawberry = 123

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Column subtraction up to 3-digits.	Column subtraction with numbers up to 4-digits.	Two-step problem in context, deciding which methods to use and why.
Ensure number sentences chosen would not be more suited to a more efficient mental strategy.	*Ensure number sentences chosen would not be more suited to a more efficient mental strategy.*	*(Provide a mixture of opportunities to apply mental and formal strategies taught)*

Stage 1:
$$\begin{array}{r} {}^{8}\cancel{9}\,{}^{12}\cancel{3}\,{}^{1}2 \\ -\ 4\ 5\ 7 \\ \hline 4\ 7\ 5 \end{array}$$

Stage 2:
$$\begin{array}{r} {}^{1}\cancel{2}\,{}^{8}\cancel{8}\,{}^{6}\cancel{7}\,{}^{1}4 \\ -\ 1\ 9\ 4\ 9 \\ \hline 1\ 9\ 2\ 5 \end{array}$$

Count backwards through zero (linking with temperature).

End of Year Expectation:

Ken is playing a game. He has 4,289 points.

Then he scores another 355 points.

Ken's target is 6,000 points.

How many **more** points does Ken need to reach his target?

$$\begin{array}{r} {}^{5}\cancel{6}\,{}^{9}\cancel{0}\,{}^{9}\cancel{0}\,{}^{1}0 \\ -\ 4\ 2\ 8\ 9 \\ \hline 1\ 7\ 1\ 1 \end{array}$$

$$\begin{array}{r} 1\ {}^{6}\cancel{7}\,{}^{10}\cancel{1}\,{}^{1}1 \\ -\quad 3\ 5\ 5 \\ \hline 1\ 3\ 5\ 6 \end{array}$$

Working together for a successful future

Upper Key Stage 2

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.

Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.
Pupils should read, spell and pronounce mathematical vocabulary correctly.

National Curriculum 2014

Working together for a successful future

Calculation Policy – Year 5: Addition & Subtraction

Pupils should be taught to:
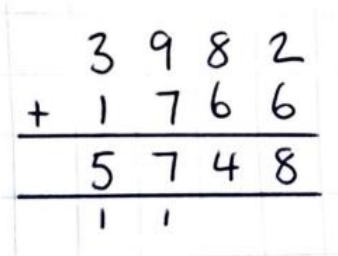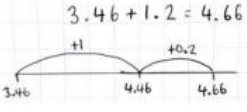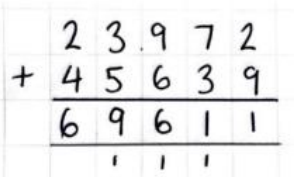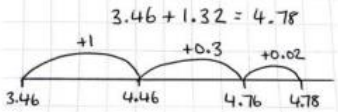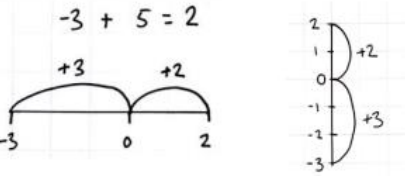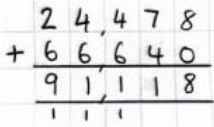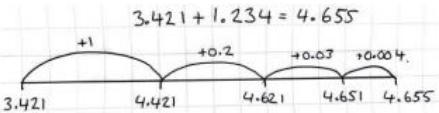
- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)

- add and 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Notes & Guidance (non-statutory)

Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency.

They practise mental calculations with increasingly large numbers to aid fluency (for example, 12 462 – 2300 = 10 162).

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Column addition with numbers up to 4-digits.	Column addition with numbers with more than 4-digits.	Multistep problem in context, deciding which methods to use and why.
Ensure number sentences chosen would not be more suited to an efficient strategy.	*Ensure number sentences chosen would not be more suited to an efficient strategy.*	*(Provide a mixture of opportunities to apply mental and formal strategies taught)*

$$3982 + 1766 = 5748$$

$$23.972 + 45639 = 69611$$

Adding involving numbers up to 1 and 2 decimal places.

$$3.46 + 1.2 = 4.66$$

Adding involving numbers up to 2 decimal places.

$$3.46 + 1.32 = 4.78$$

Adding with negative numbers (linking with temperature).

$$-3 + 5 = 2$$

This table shows the number of people living in various towns in England.

Town	Population
Bedford	82,448
Carlton	48,493
Dover	34,087
Formby	24,478
Telford	66,640

What is the **total** of the numbers of people living in Formby and in Telford?

$$24,478 + 66,640 = 91,118$$

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Adding involving numbers up to 3 decimal places.

$$3.421 + 1.234 = 4.655$$

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Column subtraction with numbers up to 4-digits.	Column subtraction with numbers up to 5-digits.	Multistep problem in context, deciding which methods to use and why.
Ensure number sentences chosen would not be more suited to a more efficient mental strategy.	*Ensure number sentences chosen would not be more suited to a more efficient mental strategy.*	*(Provide a mixture of opportunity to apply mental and formal strategies taught)*

Stage 1:

Column subtraction $2874 - 1949 = 1925$ (shown with regrouping)

Subtracting involving numbers up to 1 and 2 decimal places.

$3.46 - 1.2 = 2.26$ (number line: 2.26, 2.46, 3.46 with jumps of -0.2 and -1)

Stage 2:

Column subtraction $74928 - 33294 = 41634$ (shown with regrouping)

Subtracting involving numbers up to 2 decimal places.

$3.46 - 1.32 = 2.14$ (number line: 2.14, 2.16, 2.46, 3.46 with jumps of -0.02, -0.3, -1)

Subtract with negative numbers (linking with temperature).

$5 - 8 = -3$ (number line: -3, 0, 5 with jumps of -3 and -5; vertical thermometer scale from -3 to 5)

End of Year Expectation:

This table shows the number of people living in various towns in England.

Town	Population
Bedford	82,448
Carlton	46,493
Dover	34,087
Formby	24,478
Telford	66,640

What is the **difference** between the numbers of people living in Bedford and in Dover?

$82,448 - 34,087 = 48,361$ (shown with regrouping)

Subtracting involving numbers up to 3 decimal places.

$3.451 - 1.231 = 2.22$ (number line: 2.22, 2.221, 2.251, 2.451, 3.451 with jumps of -0.001, -0.03, -0.2, -1)

Working together for a successful future

Calculation Policy – Year 6: Addition & Subtraction

Pupils should be taught to:

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

- 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

- 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.

Notes & Guidance (non-statutory)

Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division (see Mathematics Appendix 1).

They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.

Common factors can be related to finding equivalent fractions.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation

Stage 1

Column addition with numbers with more than 4-digits.

Ensure number sentences chosen would not be more suited to an efficient strategy.

$$\begin{array}{r} 2\ 3\ .\ 9\ 7\ 2 \\ +\ 4\ 5\ \ 6\ 3\ 9 \\ \hline 6\ 9\ 6\ 1\ 1 \\ \end{array}$$

Adding involving numbers up to 3 decimal places.

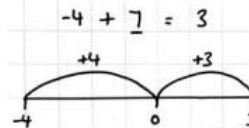$3.421 + 1.234 = 4.655$

3.421   4.421   4.621   4.651   4.655
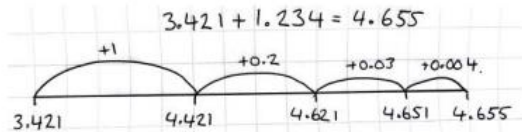
Stage 2

Adding negative numbers in context.

Here are the temperatures in four cities at midnight and at midday.

City	Temperature	
	At midnight	At midday
Paris	−4°C	−2°C
Oslo	−13°C	−7°C
Rome	3°C	10°C
Warsaw	−6°C	2°C

At **midnight**, how many degrees colder was Paris than Rome?

[   ] degrees

$-4 + 7 = 3$

End of Year Expectation

Multistep problem in context, deciding which methods to use and why.

(Provide a mixture of opportunities to apply mental and formal strategies taught)

At the start of June, there were 1,793 toy cars in the shop.

During June,

- 8,728 more toy cars were delivered
- 9,473 toy cars were sold.

How many toy cars were left in the shop at the end of June?

$$\begin{array}{r} 1\ 7\ 9\ 3 \\ +\ 8\ 7\ 2\ 8 \\ \hline 1\ 0,5\ 2\ 1 \\ \end{array}$$

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

Answer = 1048

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation

Stage 1

Column subtraction with number with more than 4-digits.

Ensure number sentences chosen would not be more suited to a more efficient mental strategy.

$$\begin{array}{r} 7\ 4\ {}^{8}\!\!\not{9}\ {}^{1}2\ 8 \\ -\ 3\ 3\ 2\ 9\ 4 \\ \hline 4\ 1\ 6\ 3\ 4 \end{array}$$

Subtracting involving numbers up to 3 decimal places.

$$3.451 - 1.231 = 2.22$$
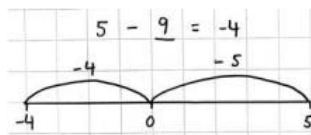

2.22 2.221 2.251 2.451 3.451

Stage 2

Subtracting with negative numbers in context.

This table shows the temperature at 9 am on three days in January.

1st January	8th January	15th January
+5°C	−4°C	+1°C

What is the difference between the temperature on 1st January and the temperature on 8th January?

[ ] °C

$$5 - 9 = -4$$

-4   0   5

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End of Year Expectation

Multistep problem in context, deciding which methods to use and why.

(Provide a mixture of opportunity to apply mental and formal strategies taught)

One Saturday afternoon, a total of 234,869 people attended three rugby matches.

- 80,978 people attended match 1
- 72,319 people attended match 2

How many people attended match 3?

$$\begin{array}{r} {}^{1}\!\not{2}\ {}^{13}3\ {}^{3}\!\not{4}\!,{}^{17}\!\not{8}\ {}^{1}6\ 9 \\ -\ \ \ 8\ 0\,,9\ 7\ 8 \\ \hline 1\ 5\ 3\,,8\ 9\ 1 \end{array}$$

$$\begin{array}{r} {}^{0}\!\not{1}\ {}^{1}5\ 3\,,8\ {}^{8}\!\not{9}\ {}^{1}1 \\ -\ \ \ 7\ 2\,,3\ 1\ 9 \\ \hline 8\ 1\,,5\ 7\ 2 \end{array}$$

Match 3 = 81,572 people

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Working together for a successful future

Lower Key Stage 2

The principal focus of mathematics teaching in lower key stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers.

At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number.

By the end of year 4, pupils should have memorised their multiplication tables up to and including the 12 multiplication table and show precision and fluency in their work.
Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.

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Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and 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 multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Notes and guidance (non-statutory)
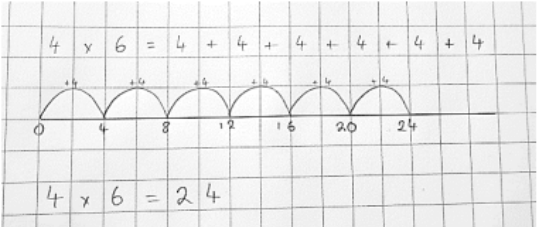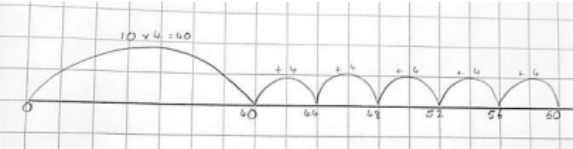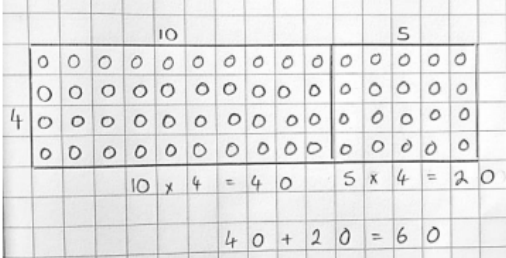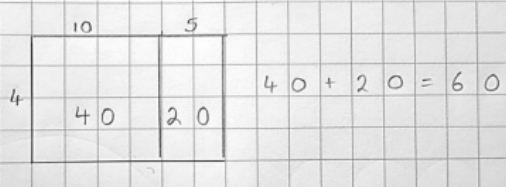
Pupils continue to practise their mental recall of multiplication tables when they are calculating mathematical statements in order to improve fluency. Through doubling, they connect the 2, 4 and 8 multiplication tables.

Pupils develop efficient mental methods, for example, using commutativity and associativity (for example, $4 \times 12 \times 5 = 4 \times 5 \times 12 = 20 \times 12 = 240$) and multiplication and division facts (for example, using $3 \times 2 = 6$, $6 \div 3 = 2$ and $2 = 6 \div 3$) to derive related facts (for example, $30 \times 2 = 60$, $60 \div 3 = 20$ and $20 = 60 \div 3$).

Pupils develop reliable written methods for multiplication and division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication and division.

Pupils solve simple problems in contexts, deciding which of the four operations to use and why. These include measuring and scaling contexts, (for example, four times as high, eight times as long etc.) and correspondence problems in which m objects are connected to n objects (for example, 3 hats and 4 coats, how many different outfits?; 12 sweets shared equally between 4 children; 4 cakes shared equally between 8 children).

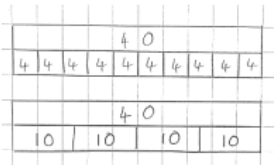| Stage 1	Stage 2	End of Year Expectation
Recall and use multiplication facts for the 3, 4 and 8 multiplication table. Unstructured number line, e.g:	**Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.** Using efficient jumps on a number line when working with larger calculations, e.g:	**Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.** Box array, e.g:
$4 \times 6 = \square$	$15 \times 4 = \square$	$15 \times 4 = \square$
	  15 x 4 = 60	 15 x 4 = 60

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Recall and use multiplication and division facts for the 2, 5 and 10 multiplication.	**Recall and use multiplication and division facts for the 3, 4 and 8 multiplication.**	**Recall and use multiplication and division facts for the 3, 4 and 8 multiplication.**
Number line or bar model to 'prove it'	Counting back on a number line, e.g:	Partitioning and box arrays, e.g:

Stage 1:

Ben has **40** cards.

He shares them equally between **4** party bags.

How many cards does he put in each bag?

	4	0							
4	4	4	4	4	4	4	4	4	4

	4	0	
10	10	10	10

"If I know that 4 x 10 = 40, then I know 40 ÷ 4 = 10".

Stage 2:

$24 \div 4 = \square$

Arrays and bar model, e.g:

$24 \div 4 = \square$

I know $6 \times 4 = 24$

So I know $24 \div 4 = 6$

	2	4
6	6	6	6

End of Year Expectation:

39 sweets shared between 3 children.
How many sweets each?

3 9 → 30 and 9
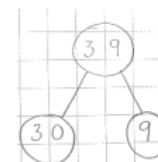
I know $30 \div 3 = 10$ and

$9 \div 3 = 3$

$10 + 3 = 13$

	1	0	3

or

	1	0	3
3	3	0	9

$39 \div 3 = 13$

Working together for a successful future
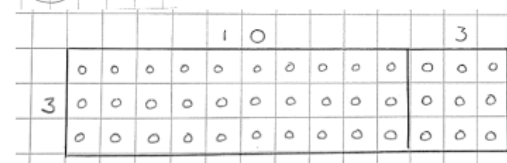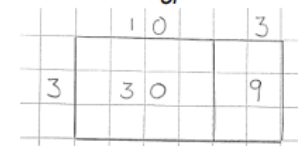
Calculation Policy – Year 4: Multiplication and Division

Pupils should be taught to

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value
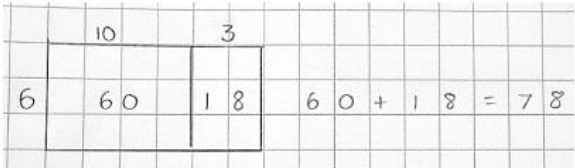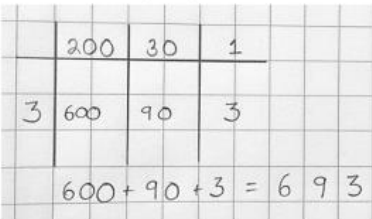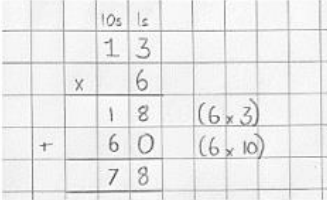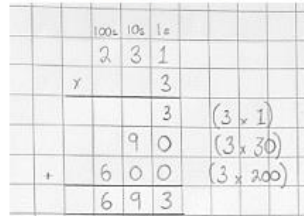
Notes and guidance (non-statutory)

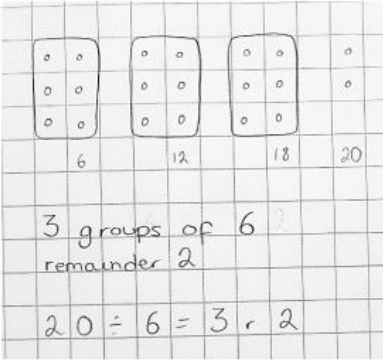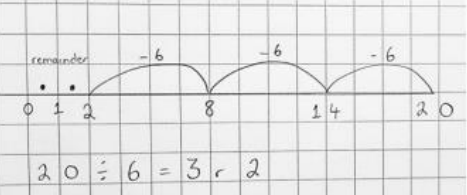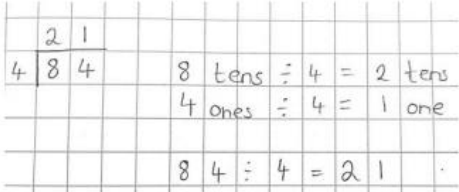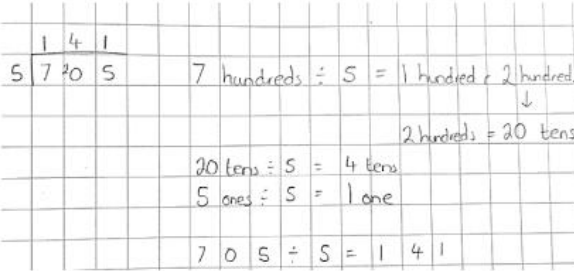Pupils continue to practise recalling and using multiplication tables and related division facts to aid fluency.

Pupils practise mental methods and extend this to three-digit numbers to derive facts, (for example $600 \div 3 = 200$ can be derived from $2 \times 3 = 6$). Pupils practise to become fluent in the formal written method of short multiplication and short division with exact answer).

Pupils write statements about the equality of expressions (for example, use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$). They combine their knowledge of number facts and rules of arithmetic to solve mental and written calculations for example, $2 \times 6 \times 5 = 10 \times 6 = 60$.

Pupils solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers. This should include correspondence questions such as the numbers of choices of a meal on a menu, or three cakes shared equally between 10 children.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Recall multiplication and division facts for multiplication tables up to 12 × 12. Using efficient jumps on a number line when working with larger calculations, e.g: $13 \times 6 = \square$ 13 x 6 =78 Box Array, e.g: $13 \times 6 = \square$ 13 x 6 =78	**Recall multiplication and division facts for multiplication tables up to 12 × 12.** 2 x 1 grid method, e.g: $13 \times 6 = \square$ 13 x 6 =78 3 x 1 grid method, e.g: $231 \times 3 = \square$ 	**Recall multiplication and division facts for multiplication tables up to 12 × 12.** 2 x 1 expanded formal method, e.g: $13 \times 6 = \square$ 13 x 6 =78 3 x 1 expanded formal method, e.g: $231 \times 3 = \square$

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Recall and use multiplication and division facts for multiplication tables up to 12 x 12. Partitioning, e.g:	**Division with remainders.** Arrays, e.g:	**Short division (up to 3-digit by 1-digit).**

Stage 1

Recall and use multiplication and division facts for multiplication tables up to 12 x 12.

Partitioning, e.g:

72 children go camping. There are 6 tents. How many children can sleep in each tent?

I know 60 ÷ 6 = **10** and

12 ÷ 6 = **2**

10 + 2 = 12

72 ÷ 6 = 12

Stage 2

Division with remainders.

Arrays, e.g:

20 eggs in boxes of 6.
How many boxes of eggs?

3 groups of 6
remainder 2

20 ÷ 6 = 3 r 2

Number line, e.g:

20 ÷ 6 = 3 r 2

End of Year Expectation

Short division (up to 3-digit by 1-digit).

84 ÷ 4 = ☐

8 tens ÷ 4 = 2 tens
4 ones ÷ 4 = 1 one

84 ÷ 4 = 21

705 ÷ 5 = ☐

7 hundreds ÷ 5 = 1 hundred r 2 hundreds
2 hundreds = 20 tens
20 tens ÷ 5 = 4 tens
5 ones ÷ 5 = 1 one

705 ÷ 5 = 141

Working together for a successful future

Upper Key Stage 2

The principal focus of mathematics teaching in upper key stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems.

Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages.
Pupils should read, spell and pronounce mathematical vocabulary correctly.

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Calculation Policy – Year 5: Multiplication and Division

Pupils should be taught to:
- 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 (non-prime) 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 and 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
- multiply and 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 multiplication and 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 multiplication and division, including scaling by simple fractions and problems involving simple rates

Notes and guidance (non-statutory)

Pupils practise and extend their use of the formal written methods of short multiplication and short division. They apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations.

They use and understand the terms factor, multiple and prime, square and cube numbers.

Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding.

Pupils use multiplication and division as inverses to support the introduction of ratio in year 6, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres.

Distributivity can be expressed as $a(b + c) = ab + ac$

They understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9^2 x 10).

Pupils use and explain the equals sign to indicate equivalence, including in missing number problems.

Calculation Policy – Year 6: Multiplication and Division

. **Pupils should be taught to:**

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- 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 addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- 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

Notes and guidance (non-statutory)
Pupils practise addition, subtraction, multiplication and division for larger numbers, using the formal written methods of columnar addition and subtraction, short and long multiplication, and short and long division.

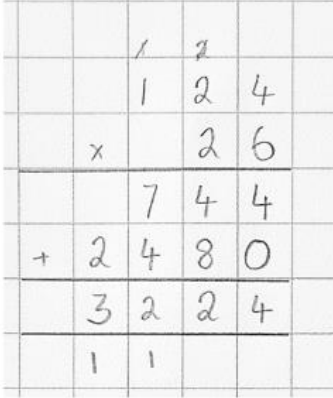They undertake mental calculations with increasingly large numbers and more complex calculations.

Pupils continue to use all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

Pupils round answers to a specified degree of accuracy, for example, to the nearest 10, 20, 50 etc., but not to a specified number of significant figures.

Pupils explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9.

Common factors can be related to finding equivalent fractions.

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Multiply up to four digits by a 1-digit number,	**Multiply up to four digits by a 1-digit number.**	**Multiply up to four digits by a 1-digit number.**
2 x 1 formal method of short multiplication, e.g:	3 x 1 formal method of short multiplication, e.g:	4 x 1 formal method of short multiplication, e.g:
13 x 6 = ☐	*231 x 3 = ☐*	*2731 x 4 = ☐*
13 x 6 = 78	231 x 3 = 693	2731 x 4 = 10 924

Working together for a successful future

Stage 1	Stage 2	End of Year Expectation
Multiply up to four digits by a 2-digit number.	**Multiply up to four digits by a 2-digit number.**	**Multiply up to four digits by a 2-digit number.**
Formal written method of long multiplication for 2-digit numbers, e.g:	Formal written method of long multiplication for 2-digit numbers, e.g:	Formal written method of long multiplication for 2-digit numbers, e.g:
$24 \times 16 = \square$	$124 \times 26 = \square$	$5227 \times 43 = \square$
$24 \times 16 = 384$	$124 \times 26 = 3\ 224$	$5227 \times 43 = 224\ 761$

Working together for a successful future