

Seabridge Primary School Calculation Policy: Addition

Year 1 Statutory Requirements

- given a number, identify one more
- 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, 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 $7 = \square - 9$.

Vocabulary

add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line

Year 1 Mental Skills and Written Algorithms

Children will use practical apparatus to derive number bonds to 10 then up to 20. They will link these number bonds to addition and subtraction and inverses. Children will also memorise and reason with number bonds to 10 and 20 and they will realise the effect of adding zero.

Children will have access to a wide range of counting equipment, everyday objects and be shown numbers in different contexts, including measure.



counters



straws



cubes



bead strings

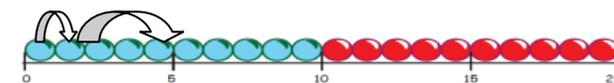
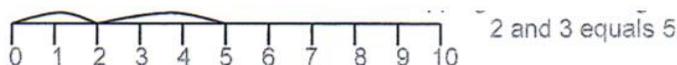


100 squares

Children will be taught to put the largest number 1st and count on.



Children will use **number tracks** moving to **beaded number lines** by counting on in ones.



Children will begin by recording informally, moving to using the mathematical symbols + and = confidently by the end of year 1. The position of the = sign will be varied.

They will add in a variety of contexts including **money and measure** and they will **write number stories** to match addition sentences.

They will use concrete apparatus to solve **missing number problems** such as:

$$2 + 3 = \square$$

$$5 + 3 + 1 = \square$$

$$\square + \triangle = 7$$

$$10 = 6 + \square$$

Year 2 Statutory Requirements

- use place value and number facts to solve problems.
- 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.

Vocabulary

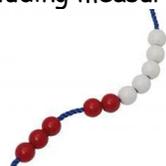
add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line, **sum**, **tens**, **units**, **partition**, **addition**, **column**

Year 2 Mental Skills and Written Algorithms

Children will have access to a wide range of counting equipment, everyday objects and be shown numbers in different contexts, including measure.



cubes



bead strings



100 squares

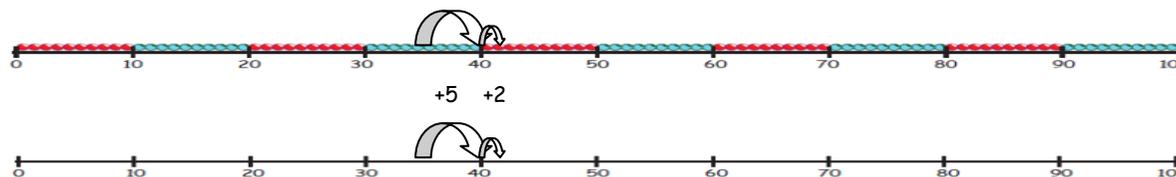


Base 10 equipment



Place value cards

Children continue to use number lines to calculate with larger numbers, starting with **beaded number lines** then moving to **landmarked number lines** e.g. $35 + 7 =$



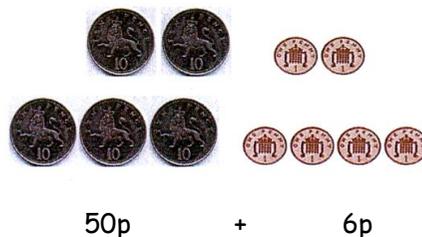
Children will add in a variety of contexts including **money and measure** and they will **write number stories** to match addition sentences.

Children will **add three or more one-digit numbers** spotting bonds to 10 or doubles e.g.

$$6 + 7 + 4 + 2 \rightarrow 10 + 7 + 2 \rightarrow 17 + 2 = 19$$

When children have a secure knowledge of place value and partitioning, they will use the columnar methods with addition that **do not cross the tens boundary** to add two 2-digit numbers. They will use appropriate apparatus laid out in columnar form:

e.g. $22p + 34p = 56p$



e.g. $22 + 34 = 56$

10s	1s	
□ □	□ □	
□ □ □	□ □	→
50	6	

10s	1s
20	2
+ 30	4
50	6 = 56

Children will use concrete apparatus and/or knowledge of inverses to solve **missing number problems** involving larger numbers.

Year 3 Statutory Requirements

- solve number problems and practical problems involving these ideas (numbers to 1000).
- add and subtract numbers mentally, including:
 - a three-digit number and ones (134 + 7)
 - a three-digit number and tens (134 + 20)
 - a three-digit number and hundreds (134 + 200)
- 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.

Vocabulary

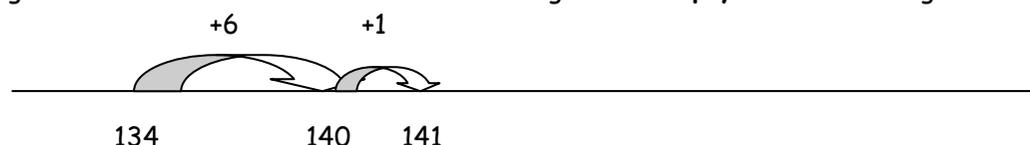
add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, **hundreds boundary, increase, vertical, 'carry', expanded, compact**

Year 3 Mental Skills and Written Algorithms

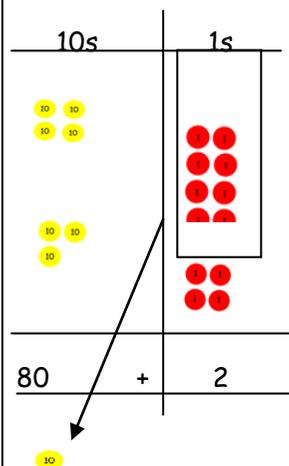
Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Children continue to use number lines to calculate with larger numbers and to support mental calculations, starting with **landmarked number lines** then moving to the **empty number line** e.g. $134 + 7 =$



Children continue to build on their understanding of place value, partitioning and their concrete experiences to develop columnar methods of addition which **bridge the tens, then hundreds**, initially in the expanded form moving to the compact method: e.g. $48 + 34 = 82$



moving to

$$\begin{array}{r} 40 \quad 8 \\ + 30 \quad 4 \\ \hline 70 \quad + 2 = 82 \\ \hline 10 \end{array}$$

then to

$$\begin{array}{r} 48 \\ + 34 \\ \hline 82 \end{array}$$

1

Children solve **missing number problems** using concrete apparatus and/or knowledge of inverses, including problems such as: $8 + 6 = 5 + \square$

Children solve **one-step** problems in a range of contexts including **money and measure**.

Year 4 Statutory Requirements

- solve number problems and practical problems with increasingly large positive numbers.
- 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.

Vocabulary

add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, **thousands**, **hundreds**, **digits**, **inverse**

Year 4 Mental Skills and Written Algorithms

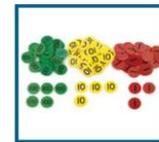
Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment

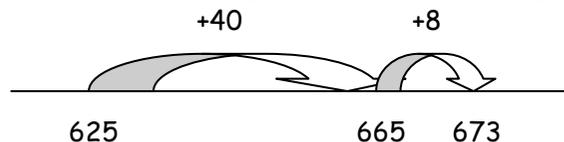


Place Value cards



Place Value Counters

Children continue to use number lines to calculate with larger numbers and to support mental calculations, using the **empty number line** by partitioning the smaller number e.g. $625 + 48 =$



Children continue to build on the expanded column strategy to develop **compact addition** with larger numbers e.g. $1468 + 4753 =$

$\begin{array}{r} \underline{1000s \ 100s \ 10s \ 1s} \\ 1000 \ 400 \ 60 \ 8 \\ +4000 \ 700 \ 50 \ 3 \\ \hline 6000 + 200 + 20 + 1 = 6221 \end{array}$	moving to \rightarrow	$\begin{array}{r} 5 \ 3 \ 4 \ 7 \\ + 2 \ 2 \ 8 \ 6 \\ \hline 7 \ 6 \ 3 \ 3 \\ 1 \ 1 \end{array}$
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Children solve **two-step** problems in a range of contexts including **money and measure**.

Year 5 Statutory Requirements

- 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.
- solve problems involving number up to three decimal places

Vocabulary

add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, thousands, hundreds, digits, inverse, **decimal places**, **decimal point**, **tenths**, **hundredths**, **thousandths**

Year 5 Mental Skills and Written Algorithms

Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment

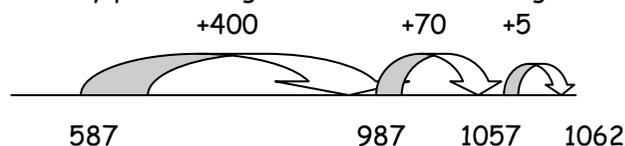


Place Value cards



Place Value Counters

Children continue to use number lines to calculate with bigger numbers and to support mental calculations, using the **empty number line** by partitioning the smaller number e.g. $587 + 475 =$



Children use the **expanded column method for money and measures**, leading to **compact column addition** for adding several amounts of money e.g. $£14.64 + £28.78 + 12.26$. This leads to using compact addition to add **decimal numbers with up to 2 places**.

$$\begin{array}{r}
 \text{£} \quad . \quad 10\text{p} \quad 1\text{p} \\
 \text{£}14 \quad . \quad 60\text{p} \quad 4\text{p} \\
 \text{£}28 \quad . \quad 70\text{p} \quad 8\text{p} \\
 + \text{£}12 \quad . \quad 20\text{p} \quad 6\text{p} \\
 \hline
 \text{£}55 \quad . \quad 60\text{p} \quad 8\text{p} \\
 \text{£}1 \quad 10\text{p}
 \end{array}
 \quad \xrightarrow{\text{moving to}} \quad
 \begin{array}{r}
 \text{£}14 \quad . \quad 64 \\
 \text{£}28 \quad . \quad 78 \\
 + \text{£}12 \quad . \quad 26 \\
 \hline
 \text{£}55 \quad . \quad 68 \\
 111
 \end{array}
 \quad \xrightarrow{\text{moving to}} \quad
 \begin{array}{r}
 15 \quad . \quad 68 \\
 + 27 \quad . \quad 86 \\
 \hline
 43 \quad . \quad 54 \\
 111
 \end{array}$$

A place value grid can be used to support addition of decimals.

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
							•			
							•			

Children use compact column addition to add **pairs of 5-digit numbers** and **towers of several larger numbers**.

Children solve **multi-step** problems in a range of contexts including **money and measure**.

Statutory Requirements

- perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Vocabulary

add, more, plus, and, make, altogether, total, equal to, equals, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, 'carry', expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

Year 6 Mental Skills and Written Algorithms

Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment

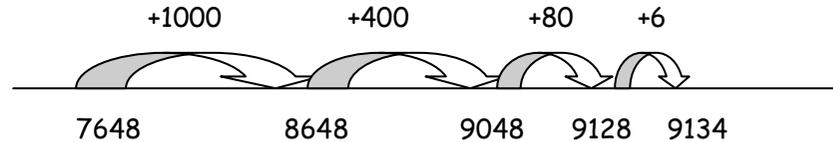


Place Value cards



Place Value Counters

Children continue to use number lines to calculate with bigger numbers and to support mental calculations, using the empty number line by partitioning the smaller number e.g. $7648 + 1486 =$



Children add **several larger whole numbers** using the columnar method.

Children add **decimals with up to 2 decimal places**, including **money**, using the compact columnar method, beginning with the expanded method if necessary e.g.

$$\begin{array}{r} \pounds 14.64 \\ \pounds 28.78 \\ + \pounds 12.26 \\ \hline \pounds 55.68 \\ 111 \end{array}$$

Children add **decimals with differing numbers of decimal places** using the columnar method. They may fill empty columns with zeros* initially to preserve place value e.g. $124.9 + 7.25 =$

$$\begin{array}{r} 124.9 + 7.25 = \\ \hline \begin{array}{r} \underline{100s} \quad \underline{10s} \quad \underline{1s} \quad \underline{.0.1s} \quad \underline{0.01s} \\ 100 \quad 20 \quad 4 \quad . \quad 9 \quad 0 \\ - \quad \quad \quad 7 \quad . \quad 2 \quad 5 \\ \hline 100 \quad 30 \quad 2 \quad . \quad 1 \quad 5 \\ 10 \quad 1 \end{array} \end{array}$$

$$\begin{array}{r} \text{Then} \quad \begin{array}{r} 124.90^* \\ + \quad 7.25 \\ \hline 132.15 \\ 11 \end{array} \end{array}$$

A place value grid can be used to support addition with decimals

Millions	Hundred thousands	Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
1,000,000s	100,000s	10,000s	1,000s	100s	10s	1s	.	0.1s	0.01s	0.001s

Children solve **multi-step** problems flexibly and confidently in a range of contexts including **money and measure**.

Seabridge Primary School Calculation Policy: Subtraction

Year 1 Statutory Requirements

- given a number, identify 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, 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 $7 = \square - 9$.

Vocabulary

equal to, less, minus, subtract, take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?

Year 1 Mental Skills and Written Algorithms

Children will use practical apparatus to derive number bonds to 10 then up to 20. They will link these number bonds to addition and subtraction and inverses. Children will memorise and reason with number bonds to 10 and 20, including subtraction facts, and they will realise the effect of adding zero.

Children will have access to a wide range of counting equipment, everyday objects and be shown numbers in different contexts, including measure.



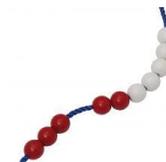
counters



straws



cubes



bead strings



100 squares

Children will be taught to put the largest number 1st and count back.



Children will use **number tracks** moving to **beaded number lines** by jumping back in ones.

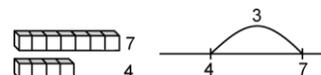


$$9 - 3 = 6$$

Children will begin by recording informally, moving to using the mathematical symbols - and = confidently by the end of year 1. The position of the = sign will be varied.

They will subtract in a variety of contexts including measure and they will write number stories to match subtraction sentences.

Children will **find the distance/difference** between 2 small numbers practically and then on number tracks and lines.



The difference between 7 and 4 is 3.

They will use concrete apparatus to solve **missing number problems** such as:

$$7 - 3 = \square$$

$$\square - \Delta = 7$$

$$7 = \square - 9$$

Year 2 Statutory Requirements

- use place value and number facts to solve problems.
- 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.

Vocabulary

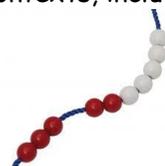
equal to, less, minus, subtract, , take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is $_?$, **difference, count on, strategy, partition, tens, units**

Year 2 Mental Skills and Written Algorithms

Children will have access to a wide range of counting equipment, everyday objects and be shown numbers in different contexts, including measure.



cubes



bead strings



100 squares

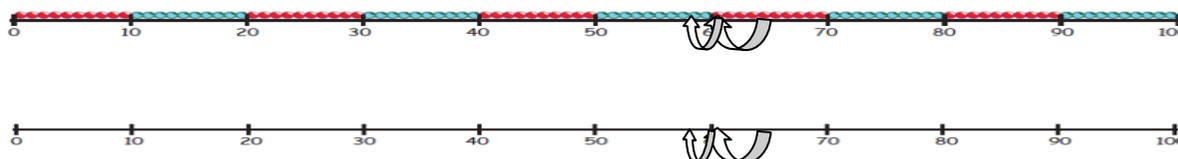


Base 10 equipment



Place value cards

Children continue to use number lines to calculate with larger numbers, starting with **beaded number lines** then moving to **landmarked number lines** e.g. $65 - 7 =$

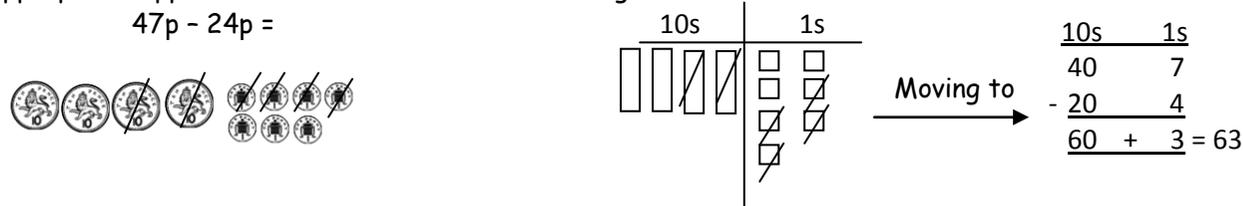


Children will subtract in a variety of contexts including money and **measure** and they will write number stories to match subtraction sentences.

Children will **find small differences** by counting on using a number line (complementary addition). They are able to choose when to subtract and when to find the difference when answering subtraction problems e.g. $55 - 37 =$



When children have a secure knowledge of place value and partitioning, they will use the columnar methods with subtraction that **do not require exchange** to subtract two 2-digit numbers. They will use appropriate apparatus laid out in columnar form: e.g. $47 - 24 =$



Children will use concrete apparatus and/or knowledge of inverses to solve **missing number problems** involving larger numbers e.g. Given $37 + 18 = 55$, $55 - \square = 18$ and $55 - \square = 37$

Year 3 Statutory Requirements

- solve number problems and practical problems involving these ideas (numbers to 1000).
- add and subtract numbers mentally, including:
 - a three-digit number and ones ($134 + 7$)
 - a three-digit number and tens ($134 + 20$)
 - a three-digit number and hundreds ($134 + 200$)
- 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.

Vocabulary

equal to, less, minus, subtract, take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is $?$, difference, count on, strategy, partition, tens, units, **exchange**, **decrease**, **hundreds**, **value**, **digit**

Year 3 Mental Skills and Written Algorithms

Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



bead strings



100 squares



Base 10 equipment



Place Value cards



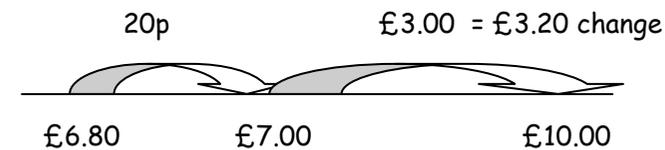
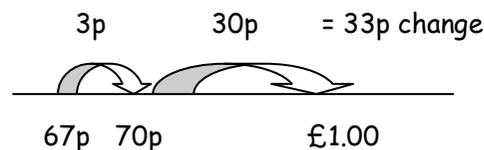
Place Value Counters

Children continue to use number lines to calculate with larger numbers and to support mental calculations, starting with **landmarked number lines** then moving to the **empty number line** e.g. $135 - 7$



=

Children **find change** from £1.00 and £10.00 using **complementary addition** (counting up) e.g.



Children use **concrete apparatus**, including place value counters to explore **exchange** in practical activities e.g. subtract 18p from 33p progressing to subtracting numbers with up to 3 digits using expanded and/or compact columnar methods:



moving to

$$\begin{array}{r} 10s \quad 1s \\ 20p \\ 30p \quad 13p \\ - 10p \quad 8p \\ \hline 10p \quad 5p = 15p \end{array}$$

$$\begin{array}{r} 341 - 123 = \\ \quad \quad 30 \\ \text{then} \quad 300 \quad \cancel{40} \quad 11 \\ - 100 \quad 20 \quad 3 \\ \hline 200 \quad 10 \quad 8 \end{array}$$

Children check answers using the inverse.

Children solve **missing number problems** using concrete apparatus and/or knowledge of inverses, including problems such as: $18 - 6 = 15 - \square$

Children solve **one-step** problems in a range of contexts including **money and measure**.

Year 4 Statutory Requirements

- solve number problems and practical problems with increasingly large positive numbers.
- 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.

Vocabulary

equal to, less, minus, subtract, take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, **inverse**

Year 4 Mental Skills and Written Algorithms

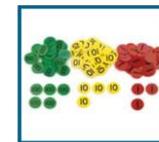
Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment

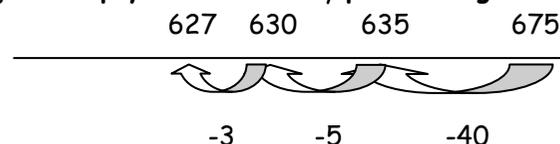


Place Value cards

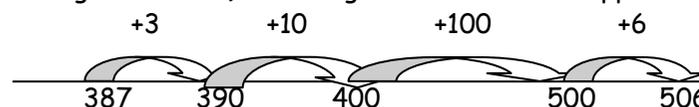


Place Value Counters

Children continue to use **number lines** to calculate with larger numbers and to support mental calculations, using the **empty number line** by **partitioning the smaller number** e.g. $675 - 48 =$



Children continue to calculate **difference** mentally by using complementary addition (counting up from the smallest to the largest number) and using a number line to support the calculation e.g. $506 - 387 =$



Children continue to build on the expanded column strategy to develop compact addition with larger numbers including with exchange e.g. $2754 - 1562 =$

1000s	100s	10s	1s	
	600			
2000	700	150	4	
- 1000	500	60	2	
	1000	100	90	2 = 1192

moving to
→

$$\begin{array}{r} 6 \\ 2 \cancel{7} 154 \\ - 1562 \\ \hline 1192 \end{array}$$

Children check answers using the inverse operation.

Children solve **two-step** problems in a range of contexts including **money and measure**. Children calculate **change** by using counting up (complementary addition).

Year 5 Statutory Requirements

- 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.
- solve problems involving number up to three decimal places

Vocabulary

equal to, less, minus, subtract, take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, **tenths, hundredths, decimal point, decimal**

Year 5 Mental Skills and Written Algorithms

Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment

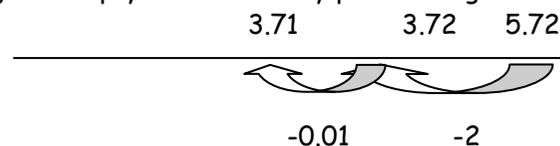


Place Value cards

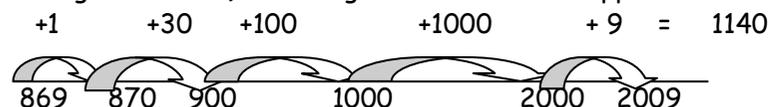


Place Value Counters

Children continue to use **number lines** to calculate with larger numbers and **decimals** to support mental calculations, using the empty number line by partitioning the smaller number e.g. $5.72 - 2.01 =$



Children continue to calculate **difference** mentally by using **complementary addition** (counting up from the smallest to the largest number) and using a number line to support the calculation e.g. $2009 - 869 =$



Children use the expanded column method for **money and measures** for numbers with up to 5 digits and involving **many exchanges**, leading to the compact column method. They also use the expanded then compact method to subtract **decimal numbers with up to 2 places and differing numbers of digits**.

$$16324 - 8516 =$$

$$\begin{array}{r} 0 \ 15 \ 1 \\ \cancel{1} \ \cancel{6} \ 13 \ \cancel{2} \ 14 \\ - \ 8 \ 5 \ 1 \ 6 \\ \hline 7 \ 8 \ 0 \ 8 \end{array}$$

and

$$123.04 - 85.6 =$$

	100s	10s	1s	. 0.1s	0.01s	
	0	110	12			
	100	/ 20	/ 3	. 10	4	
-		80	5	. 6	0	
		30	7	. 4	4	= 37.44

$$123.04 - 85.6 =$$

then \rightarrow

$$\begin{array}{r} 0 \ 11 \ 12 \\ \cancel{1} \ \cancel{2} \ \cancel{3} \ . \ 10 \ 4 \\ - \ 8 \ 5 \ . \ 6 \ 0 \\ \hline 3 \ 7 \ . \ 4 \ 4 \end{array}$$

Children check answers using the inverse operation.

Children apply all the above methods in solving **multi-step problems**.

A place value grid can be used to support subtraction of decimals (see addition policy).

Year 6 Statutory Requirements

- perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Vocabulary

equal to, less, minus, subtract, take, take away, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is_?, difference, count on, strategy, partition, tens, units, exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

Year 6 Mental Skills and Written Algorithms

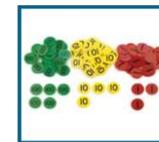
Children will continue to access concrete apparatus to consolidate understanding before moving to written methods e.g.



Base 10 equipment



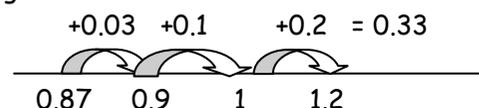
Place Value cards



Place Value Counters

Children continue to use **number lines** to calculate with larger numbers and **decimals** to support mental calculations, using the empty number line by partitioning the smaller number (see Year 5)

Children continue to calculate **difference** mentally by using **complementary addition** (counting up from the smallest to the largest number) including for **decimal numbers**, using a number line to support the calculation e.g. $1.2 - 0.87$



Children continue to subtract **increasingly larger numbers** and **decimals** using the compact method where appropriate e.g.

$$\begin{array}{r}
 34685 - 16458 = \\
 \begin{array}{r}
 2 \quad 7 \\
 \cancel{3} 14 \cancel{6} \cancel{8} 15 \\
 - 1 \quad 6 \quad 4 \quad 5 \quad 8 \\
 \hline
 1 \quad 8 \quad 2 \quad 2 \quad 7
 \end{array}
 \end{array}$$

and

$$\begin{array}{r}
 324.9 - 7.25 = \\
 \begin{array}{r}
 1 \quad 8 \\
 3 \cancel{2} 14 \cdot \cancel{9} 10 \\
 - \quad \quad 7 \cdot 2 \quad 5 \\
 \hline
 3 \quad 1 \quad 7 \cdot 6 \quad 5
 \end{array}
 \end{array}$$

A place value grid can be used to support subtraction of decimals (see addition policy).

Children apply all the above methods flexibly and confidently in solving **multi-step problems**.

Seabridge Primary School Calculation Policy: Multiplication

Year 1 Statutory Requirements

- count in multiples of two, five and ten
- 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.

Vocabulary

groups of, lots of, times, array, altogether, multiply, count

Year 1 Mental Skills and Written Algorithms

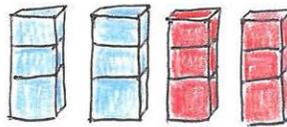
Mental Skills

Children will: -

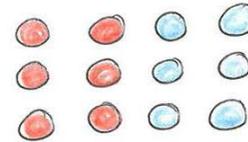
- count in multiples of 2, 5 and 10.
- know doubles of numbers 1 - 10

Grouping

Children will use visual and concrete arrays and 'sets of' objects to find the answers to '4 lots of 3' etc



or



Problem Solving

Children will solve practical problems involving counting equal sets or groups, using concrete objects, arrays and pictorial representations e.g.

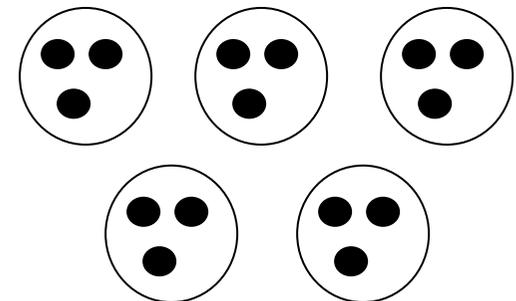
How many legs will 4 teddies have?



$$2 + 2 + 2 + 2 = 8$$

There are 3 sweets in one bag.

How many sweets are in 5 bags altogether?



Year 2 Statutory Requirements

- 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 (\times), division (\div) 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.

Vocabulary

groups of, lots of, times, array, altogether, multiply, count, **multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times...**

Year 2 Mental Skills and Written Algorithms

Mental Skills

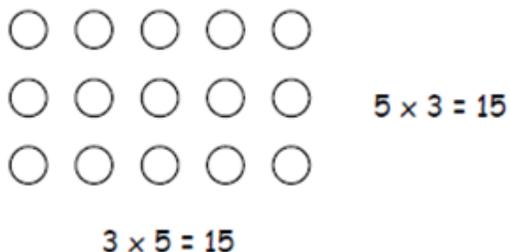
Children will: -

- count in multiples of 2, 5, 10 and 3
- know the doubles of numbers 1 - 20
- know by heart the 2, 5 and 10 times tables

Grouping

Children will multiply using practical apparatus leading to arrays and repeated addition:

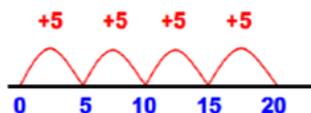
Arrays



Arrays will also be used to show that multiplication can be done in any order (commutative).

Repeated Addition

Recorded on a number line e.g. 5×4 or as a number sentence



$$5 + 5 + 5 + 5 = 20$$

Problem Solving

Children will solve a range of problems in different contexts involving multiplication, using concrete objects, arrays, repeated addition, mental methods, and multiplication facts.

Year 3 Statutory Requirements

- 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.

Vocabulary

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, times, _times as big as, once, twice, three times..., **partition, grid method, multiple, product, tens, units, value**

Year 3 Mental Skills and Written Algorithms

Mental Skills

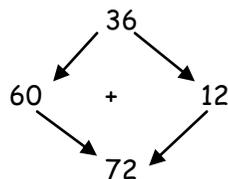
Children will: -

- count in multiples of 4, 8, 50 and 100
- know the doubles of multiples of five to 100 e.g. double 35 is 70
- know by heart the 3, 4 and 8 times tables
- multiply whole numbers by 10 and 100

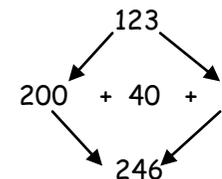
Written Algorithms

Use partitioning to double 2- and 3-digit numbers e.g.

Double 36:

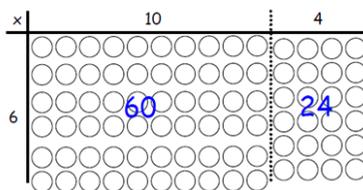


Double 123



Children continue to use concrete apparatus, number lines and/or arrays to support mental strategies for multiplications within the tables they know.

Children build on partitioning to develop grid multiplication for multiplying 2-digit numbers by a 1-digit number beginning by linking the layout of the grid to arrays e.g. 14×6



leading to...

$$= 84$$

x	10	4
6	60	24

Problem Solving

Children solve problems in a variety of contexts, including missing number problems and scaling problems e.g.

3 hats and 4 coats. How many different outfits?

or

Sally's ribbon is three times as long as Ann's. If Ann's ribbon is 8cm, how long is Sally's ribbon?

Year 4 Statutory Requirements

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Vocabulary

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, groups of, sets of, lots of, equal groups, times, multiply, times as big as, once, twice, three times... partition, grid method, total, multiple, product, sets of, **inverse**

Year 4 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- count in multiples of 6, 7, 9, 25 and 1000
- know by heart all the multiplication facts up to 12×12
- recognise factors up to 12 of 2-digit numbers
- multiply whole numbers and one place decimals by 10, 100 & 100
- Find doubles beyond 100 including money

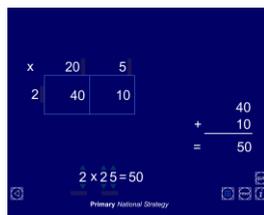
Written Algorithms

Children will multiply 2- and 3- digit numbers by a 1-digit number beginning by using the grid method supported by concrete apparatus e.g. place value counters.

e.g. 46×3

x	40	3	
3	120	9	= 129

$$\begin{array}{r|l} 253 \times 6 & \\ \hline 6 & 1200 \quad 300 \quad 18 = 1518 \end{array}$$



ITP Multiplication Grid

Children will progress to using a vertical algorithm for multiplying 2- and 3-digit numbers by a 1-digit number

e.g. 253×6

$$\begin{array}{r} 253 \\ \times 6 \\ \hline 1200 \\ 300 \\ \hline 18 \\ \hline 1518 \end{array}$$

Problem Solving

Children solve problems in a variety on contexts, including missing number problems and scaling problems

e.g.

3 hats and 4 coats. How many different outfits?

or

Sally's ribbon is three times as long as Ann's. If Ann's ribbon is 8cm, how long is Sally's ribbon?

Year 5 Statutory Requirements

- 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 1- or 2-digit number using a formal written method, including long multiplication for 2-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.

Vocabulary

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, _times as big as, once, twice, three times..., partition, grid method, **total**, multiple, product, inverse, **square**, **factor**, **integer**, **decimal**, **short/long multiplication**, **carry**'

Year 5 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- count in powers of 10 from any given number up to 1 000 000
- continue to practise & confidently apply the multiplication tables up to 12×12
- multiply whole numbers and 1 & 2 place decimals by 10, 100, 1000 and 10 000
- double larger numbers including money by partitioning
- use doubling and halving as a strategy in mental multiplication e.g. 58×5 is half of 58×10 , $\times 4$ is double/double etc

Written Algorithms

Children will use the short algorithm for multiplying 2-, 3- and 4-digit numbers by a 1-digit number

e.g.
$$\begin{array}{r} 387 \\ \times 6 \\ \hline 2322 \\ 54 \end{array}$$

Children will use long multiplication to multiply numbers up to 4 digits by a 2-digit number

e.g.
$$\begin{array}{r} 387 \\ \times 14 \\ \hline 3870 \\ 1548 \\ \hline 5418 \\ 11 \end{array}$$

Children will begin to recognise the efficiency of different methods.

Children will use partitioning and / or grid multiplication to multiply decimal numbers with up to 2 places by single digit numbers e.g. 4.7×3 is $(4 \times 3) + (0.7 \times 3) = 12 + 2.1 = 14.1$

or

x	4	0.7
3	12	2.1

 = 14.1

Children will multiply fractions by single digit numbers (see fractions policy)

Problem Solving

Children will solve problems in a range of contexts using all four operations and including their knowledge of factors, multiples, squares and cubes. They will also solve problems involving scaling by simple fractions.

N.B. Grid multiplication provides a default method for ALL pupils

Statutory Requirements

- 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

Vocabulary

groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, array, column, row, commutative, sets of, equal groups, times as big as, once, twice, three times... partition, grid method, total, multiple, product, inverse, square, factor, integer, decimal, short / long multiplication, „carry“, **tenths, hundredths, decimal**

Year 6 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- use doubling and halving as strategies in mental multiplication
- double decimal numbers with up to 2 decimal places by using partitioning
- multiply decimal numbers using near multiples by rounding e.g. 4.3×19 is $4.3 \times 20 - 4.3$

Written Algorithms

Children use the short algorithm to multiply larger numbers by a 1-digit number

e.g.

$$\begin{array}{r} 3875 \\ \times \quad 6 \\ \hline 23250 \\ 543 \end{array}$$

Children will use the long algorithm to multiply larger numbers by 2-digit numbers (see Year 5)

Children will use adjusting ($\times 100$ and $\div 100$) and short multiplication to multiply decimal numbers
e.g. 13.72×6 ($\times 13.72$ by 100) $1372 \times 6 \div 100$

Children will multiply proper and improper fractions (see fractions policy)

Problem Solving

Children will apply multiplications skills to solve multi-step problems in a variety of contexts.

N.B. Grid multiplication provides a default method for ALL pupils

Seabridge Primary School Calculation Policy: Division

Year 1 Statutory Requirements

- count in multiples of two, five and ten
- 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.

Vocabulary

share, share equally, one each, two each...,
group, groups of, lots of, array

Year 1 Mental Skills and Written Algorithms

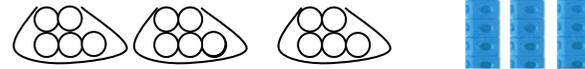
Mental Skills

Children will: -

- count in 2s, 5s and 10s.
- know halves of even numbers to 20

Grouping

Children begin to use visual and concrete arrays and sets of objects to solve problems like 'How many groups of 5 can I make with 15 objects?'



Children should use lots of practical apparatus, arrays and picture representations

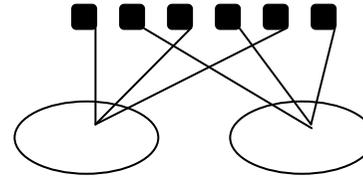
Practical apparatus - towers of cubes for grouping, assorted objects

Sharing Equally

Children share items equally using sharing circles where there are no remainders, (see below.)

e.g. 6 sweets are shared equally between 2 people. How many sweets does each one get?

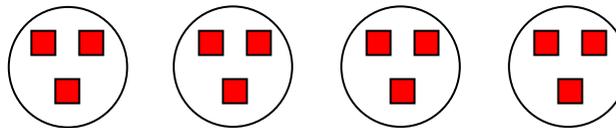
Recording as a pictorial representation.



Halving

Children begin halving a quantity by sharing between two e.g. half of 16 cubes by repeatedly giving each child one.

Using 'sharing circles' to share other quantities e.g. $\frac{1}{4}$ of 12 as 12 objects shared between 4 circles



Year 2 Statutory Requirements

- 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 (\times), division (\div) 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.

Vocabulary

share, share equally, one each, two each..., group, equal groups of, lots of, array, **divide**, **divided by**, **divided into**, **division**, **grouping**, **number line**, **left**, **left over**

Year 2 Mental Skills and Written Algorithms

Mental Skills

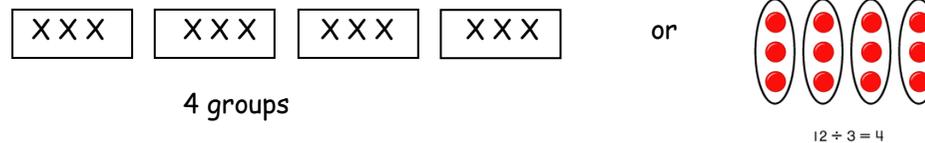
Children will: -

- count in 2s, 5s, 10s and 3s
- know the halves of even numbers to 40
- know by heart the 2, 5 and 10 times tables and corresponding division facts

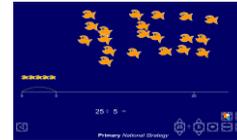
Grouping

Children relate division number sentences to multiplication by reading $12 \div 3$ as 'How many 3s in 12?'

They use pictorial representation such as pictures and arrays e.g. $12 \div 3$ (12 objects into groups of 3)

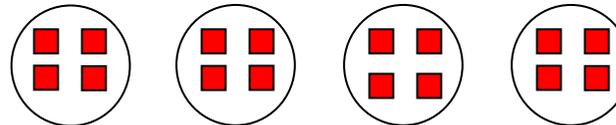


Children begin to use a number line to support the grouping strategy using the ITP Grouping programme



Sharing Equally

Children find a half or a quarter of quantities using sharing e.g. $\frac{1}{4}$ of 16 by sharing 16 cubes into 4 towers or using sharing circles



Problem Solving

Children solve problems involving division related to real life situations e.g. a book costs £3. How many books can I buy for £12?

Year 3 Statutory Requirements

- 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.

Vocabulary

share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, **inverse**, **short division**, **carry**, **remainder**, **multiple**

Year 3 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- count in multiples of 4, 8, 50 and 100
- know the halves of multiples of ten to 100 e.g. half of 70 is 35
- halve odd numbers to 20
- know by heart the 3, 4 and 8 times tables and the corresponding division facts
- divide whole numbers by 10 and 100 to give a whole number answer
- use doubling to link the 2, 4 and 8 times tables

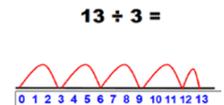
Children find halves of even numbers to 100 by partitioning e.g. $\frac{1}{2}$ of 54

$$\begin{array}{r} 50 + 4 \\ \downarrow \quad \downarrow \\ 25 + 2 = 27 \end{array}$$

Children understand the links between multiplication and division and write related facts e.g. $2 \times 3 = 6$; $3 \times 2 = 6$; $6 \div 2 = 3$; $6 \div 3 = 2$

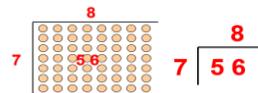
Progression to Written Methods

Step 1: Build on Year 2 work using a number line to work out divisions within tables including remainders.



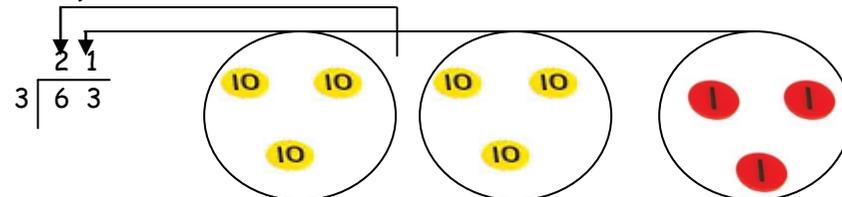
Step 2: Short division of 2-digit numbers divided by a single digit with NO remainders:

a) Begin with arrays



b) Use Place Value Counters to divide larger 2-digit numbers using grouping, limiting all numbers to NO remainders in the answer or carried i.e. each digit should be a multiple of the divisor e.g. $63 \div 3$. This leads to the short division 'bus stop' method. (Refer to NCETM division video: Representing division with place value counters)

e.g. $63 \div 3$



Year 4 Statutory Requirements

- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Vocabulary

share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, „carry“, remainder, multiple, **divisible by, factor, divisor, dividend, quotient**

Year 4 Mental Skills and Written Algorithms

Mental Skills

- count in multiples of 6, 7, 9, 25 and 1000
- know by heart all the multiplication facts up to 12×12 and the corresponding division facts
- recognise factors up to 12 of 2-digit numbers
- divide whole numbers and one place decimals by 10, 100 & 100
- Find halves of numbers beyond 100 including money

Formal Written Methods

Use place value counters practically before each step and link this to the written algorithm. (Refer to NCETM division videos)

Step 1

Children build on the place value counter work started in Year 3, beginning with all digits being a multiple of the divisor and using 3-digit numbers divided by a single digit e.g. $848 \div 4$

Step 2

As step 1 but introduce remainders in the ones column e.g. $845 \div 4$.

Step 3

Introduce remainders within the calculation in the tens column but with no remainder in the final answer e.g. $872 \div 4$. Children should be taught to exchange the left over tens into ones and record this as a 'carry forward' in the written algorithm i.e.

$$\begin{array}{r} 218 \\ 4 \overline{) 872} \end{array}$$

Step 4

As above with remainders in the final answer e.g. $875 \div 4$

Year 5 Statutory Requirements

- 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 1- or 2-digit number using a formal written method, including long multiplication for 2-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.

Vocabulary

share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, inverse, divisor, dividend, quotient, **prime number, prime factors, composite number (non-prime)**

Year 5 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- count in powers of 10 from any given number up to 1 000 000
- continue to practise & confidently apply the multiplication tables up to 12 x 12 and corresponding division facts
- divide whole numbers and 1 & 2 place decimals by 10, 100, 1000 and 10 000
- halve larger numbers including money by partitioning
- use doubling and halving as a strategy in mental multiplication e.g. 58×5 is half of 58×10 , $\times 4$ is double/double etc

Formal Written Methods

Use place value counters practically before each step and link this to the written algorithm. (Refer to NCETM division videos). Children build on work begun in years 3 and 4.

Step 1

Recap division stages outlined in Year 4 (steps 1 - 4).

Step 2

Introduce remainders and 'carry forwards' in the hundreds column only, including examples where the answer for the first column is zero e.g.

	0	4	2
4	1	12	8

Step 3

Introduce remainders in other columns recording 'carries' as necessary e.g.

	0	6	6	3	r	5
8	5	3	0	9		

Step 4

All of the above using 4-digit numbers divided by a single digit.

Statutory Requirements

- 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

Vocabulary

share, share equally, one each, two each..., group, equal groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, 'carry', remainder, multiple, divisible by, factor, inverse, divisor, dividend, quotient, prime number, prime factors, composite number (non-prime), **common factor**

Year 6 Mental Skills and Written Algorithms

Mental Skills

Children will: -

- use doubling and halving as strategies in mental division
- halve decimal numbers with up to 2 decimal places by using partitioning
- halve decimal numbers using near multiples by rounding e.g. 4.3×19 is $4.3 \times 20 - 4.3$

Formal Written Methods

Short Division

Pupils continue to use short division when dividing by a single digit e.g. $3629 \div 8$ (see Year 5). They should understand how to express any remainders as fractions, decimals, whole number remainders or rounded numbers as well as interpret remainders in context.

Long Division

This will link to the 'chunking' strategy where children subtract chunks of the divisor until either zero or a remainder is reached. They will begin by writing a 'useful list' to help them decide which chunks to use e.g.

$$972 \div 36$$

Useful List for multiples of 36:

$\times 1 = 36$	$\times 2 = 72$
$\times 10 = 360$	$\times 5 = 180$
$\times 20 = 720$	
$\times 100 = 3600$	

$$\begin{array}{r} 27 \\ 36 \overline{) 972} \\ \underline{- 720} \quad (\times 20) \\ 252 \\ \underline{- 180} \quad (\times 5) \\ 72 \\ \underline{- 72} \quad (\times 2) \\ 0 \end{array} \quad \left. \vphantom{\begin{array}{r} 27 \\ 36 \overline{) 972} \\ \underline{- 720} \\ 252 \\ \underline{- 180} \\ 72 \\ \underline{- 72} \\ 0 \end{array}} \right\} 27 \text{ lots of } 36$$