

Folksworth Church of England (VC) Primary School

Calculations Policy: Addition and Subtraction Methods



Inspiring a love of learning through
the bonds of **family, faith and friendship.**

Year 1

Addition and Subtraction

Objectives

- 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 $7 = \square - 9$.

Key Skills

Addition

- Read and write numbers to 100 in numerals, incl. 1—20 in words
- Recall bonds to 10 and 20, and addition facts within 20
- Count to and across 100
- Count in multiples of 1, 2, 5 and 10
- Solve simple 1-step problems involving addition, using objects, number lines and pictorial representations.

Subtraction

- Given a number, say **one more or one less**.
- Count to and over 100, **forward and back**, from any number.
- Represent and use **subtraction facts to 20 and within 20**.
- Subtract with **one-digit and two-digit** numbers to 20, including zero.
- Solve one-step problems that involve addition and subtraction, using concrete objects (ie bead string, objects, cubes) and pictures, and missing number problems.
- Read and write numbers from 0 to 20 in numerals and words.

Vocabulary

Addition

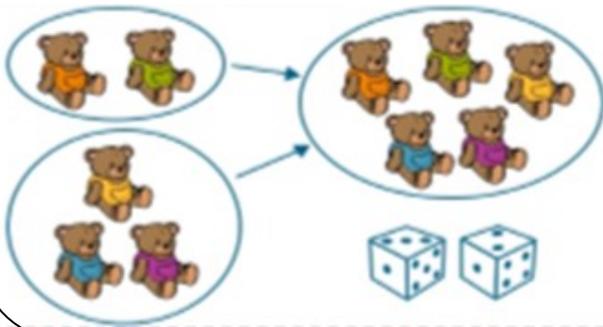
add, more, plus, and, put together, make, altogether, total, equal to, equals, double, most, count on, number line

Subtraction

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

Year 1 Addition

Immerse children in practical opportunities to develop understanding of addition and subtraction. Link practical representations on a number track and on a beadstring to then recording on a filled number line.



3 bears and 2 bears is 5 bears altogether

$$3 + 2 = 5$$



Add one-digit and two-digit numbers to 20 including 0

Use numbered number lines to add, by counting on in ones. Encourage children to start with the **larger** number and count on.



Beadstrings or beadbars can be used to illustrate addition including bridging through 10 by counting on 2 and then counting on 3.

$$8 + 5 =$$



Children should:

- Have access to a wide range of counting equipment, everyday objects, number tracks and number lines, and be shown numbers in different contexts.
- Read and write the addition (+) and equals (=) signs within number sentences.
- Interpret addition number sentences and solve missing box problems, using concrete objects and number line addition to solve them: $8 + 3 = \square$ $15 + 4 = \square$ $5 + 3 + 1 = \square$ $\square + \square = 6$ $15 = \square + \square$

Number Family

By the end of Year 1 children should be able to recall and use facts within and to 20

If we know $4 + 5 = 9$

We also know: ,

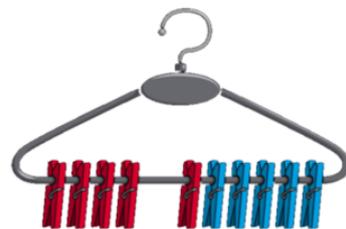
$$5 + 4 = 9$$

$$9 - 5 = 4$$

$$9 - 4 = 5$$

$$14 + 5 = 19$$

$$19 - 14 = 5, \text{ etc}$$



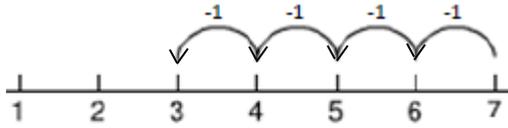
Year 1 Subtraction

Subtract from numbers up to 20

Immerse children in practical opportunities to develop understanding of addition and subtraction. Link practical representations to a number track and on a beadstring, to then recording on a filled number line.

Subtracting by taking away

Consolidate understanding of subtraction practically before moving on to using number tracks then numbered number lines and hundred squares to subtract by counting back in ones and tens.



$$7 - 4 = 3$$



Beadstrings or beadbars can be used to illustrate subtraction including bridging through 10 by counting back 3 and then counting back another 2.

$$13 - 5 = 8$$

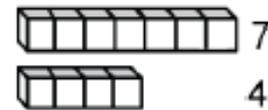


Find the 'difference between'

This should be introduced practically first with an emphasis on the language 'find the difference between' and 'how many more'

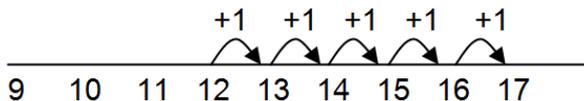


Tom has 5 bears. Sara has 3 bears.
How many more bears does Tom have?



7 is 3 more than 4. I am 3 years older than my sister

$$17 - 12 = 5$$



Number Families

By the end of Year 1 children should be able to recall and use facts within and to 20

If we know $4 + 5 = 9$

We also know: ,

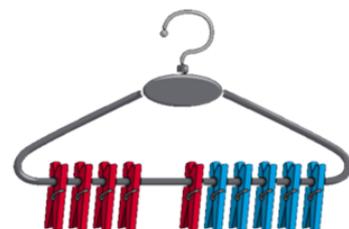
$$5 + 4 = 9$$

$$9 - 5 = 4$$

$$9 - 4 = 5$$

$$14 + 5 = 19$$

$$19 - 14 = 5, \text{ etc}$$



Subtract using patterns of known facts

E.g. $7 - 3 = 4$ so we know $17 - 3 = 14$,

$$10 - 6 = 4$$

Year 2

Addition and Subtraction

Objectives

- 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.

Key Skills

Addition

- Add a 2-digit number and ones (e.g. $27 + 6$)
- Add a 2-digit number and tens (e.g. $23 + 40$)
- Add pairs of 2-digit numbers (e.g. $35 + 47$) and add three single-digit numbers (e.g. $5 + 9 + 7$)
- Show that adding can be done in any order (the commutative law).
- Recall bonds to 20 and bonds of tens to 100 ($30 + 70$ etc.)
- Count in steps of 2, 3 and 5 and count in tens from any number.
- Understand the place value of 2-digit numbers (tens and ones)
- Compare and order numbers to 100 using $<$ $>$ and $=$ signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve problems with addition, using concrete objects, pictorial representations, involving numbers, quantities and measures, and applying mental and written methods.

Subtraction

- Recognise the place value of each digit in a two-digit number.
- Recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100.
- Subtract using concrete objects, pictorial representations, 100 squares and mentally, including: a two-digit number and ones, a two-digit number and tens, and two two-digit numbers.
- Show that subtraction of one number from another cannot be done in any order.
- Recognise and use inverse relationship between addition and subtraction, using this to check calculations and missing number problems.
- Solve simple addition and subtraction problems including measures, using concrete objects, pictorial representation, and also applying their increasing knowledge of mental and written methods.
- Read and write numbers to at least 100 in numerals and in words.

Vocabulary

Addition

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

Subtraction

equal to, take, take away, less, minus, subtract, 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 Addition

Mental Strategies

Develop mental fluency with addition and place value involving 2-digit numbers, then establish more formal methods.

Use empty number lines, concrete equipment (Base 10, beadstrings, Numicon, hundred squares etc.) to build confidence and fluency in mental addition skills.

16 + 7

Bridge through 10 using known

Counting on in 10s
 $27 + 30 =$

27 + 30

27 37 47 57

Number Family

If I know:
 $2 + 3 = 5$

I also know:
 $3 + 2 = 5$
 $20 + 30 = 50$
 $30 + 20 = 50$

Special Strategy
Rounding and adjusting
 $+ 9 + 11$

$35 + 9 =$

Written Strategies

Add pairs of 2-digit numbers using a blank number line, moving to the expanded column method when secure adding tens and units. To support understanding children should start by physically making and carrying out the calculation using base 10, Numicon or other apparatus then compare their practical version with the written form to develop conceptual understanding.

Step 1: only provide examples that do NOT cross the tens boundary until they are secure with the method itself.

63 + 16

63 73 79

→

| | | |
|---|---|-------|
| | 2 | 3 |
| + | 3 | 4 |
| | | <hr/> |
| | | 7 |
| | 5 | 0 |
| | | <hr/> |
| | 5 | 7 |

Step 2: once children can add a multiple of ten to a 2-digit number mentally (e.g. $80 + 11$), they are ready for adding pairs of 2-digit numbers that DO cross the tens boundary (e.g. $58 + 43$).

| | | |
|---|---|-------|
| | 5 | 8 |
| + | 4 | 3 |
| | | <hr/> |
| | 1 | 1 |
| | 9 | 0 |
| | | <hr/> |
| | 1 | 0 |
| | 0 | 1 |

Mental Strategies

Year 2 Subtraction

Develop mental fluency with subtraction and place value involving 2-digit numbers, then establish more formal methods.

Use empty number lines, concrete equipment (Base 10, beadstrings, Numicon, hundred squares etc.) to build confidence and fluency in mental subtraction skills.

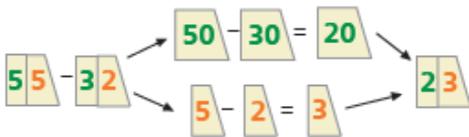
Using Place Value

Know 1 less or 10 less than any number

E.g. 1 less than 74, 10 less than 82

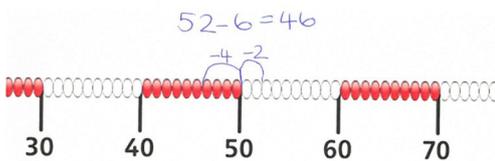
Partitioning

E.g. $55 - 32$ as $50 - 30$ and $5 - 2$ then combine $20 + 3$



Bridging through 10

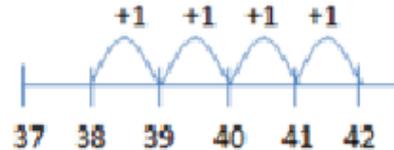
$52 - 6$ as $52 - 2$ then $-4 = 46$



Special Strategy Counting on

Children are taught to recognise when numbers are close together, it is more efficient to count on and find the difference.

$$42 - 38 = 4$$



Number Family

If I know:

$$5 - 3 = 2$$

I also know:

$$50 - 30 = 20$$

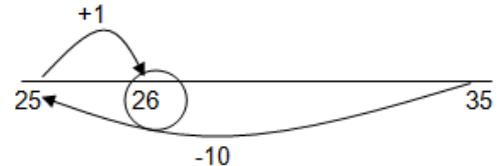
$$50 - 20 = 30$$

$$35 - 2 = 33$$

Special Strategy

Rounding and adjusting

- 9, - 11 $35 - 9 = 26$ model thought process as



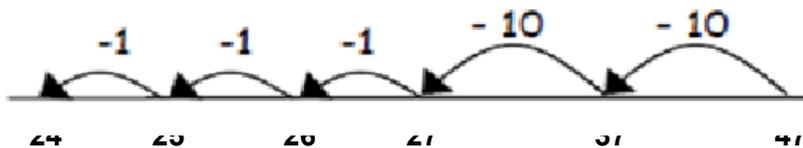
Written Strategies

Subtract pairs of 2-digit numbers

Children should start by physically making and carrying out the calculation using base 10, Numicon, hundred squares or other apparatus then compare their practical version with the written form to develop conceptual understanding.

Step 1: partition the second number and subtract it in tens then units.

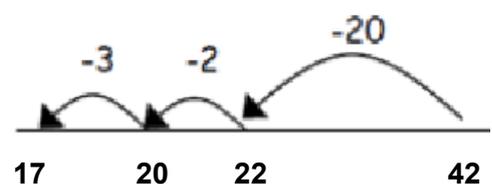
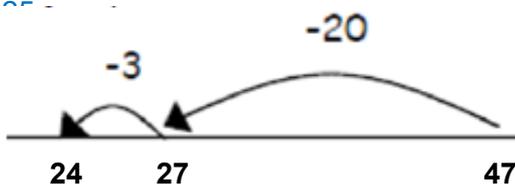
$$47 - 23 = 24$$



Estimate
Calculate
Check it!

Step 2: when confident use more efficient jumps back
children to

Bridging through 10 will allow children to become more efficient



Year 3

Addition and Subtraction

Objectives

- Add and subtract numbers mentally
 - 3 digit number and 1s
 - 3 digit number and 10s
 - 3 digit number and 100s
- Add and subtract numbers with up to 3 digits using formal written methods of columnar addition and subtraction.
- Estimate the answer to a calculation and use inverse operations to check the answers
- Solve problems including, missing number problems, using number facts, place value, and more complex addition and subtraction

Key Skills

Addition

- Read and write numbers to 1000 in numerals and words.
- Add 2-digit numbers mentally, incl. those exceeding 100.
- Add a three-digit number and ones mentally ($175 + 8$)
- Add a three-digit number and tens mentally ($249 + 50$)
- Add a three-digit number and hundreds mentally ($381 + 400$)
- Estimate answers to calculations, using inverse to check answers.
- Solve problems, including missing number problems, using number facts, place value, and more complex addition.
- Recognise place value of each digit in 3-digit numbers (hundreds, tens, ones.)
- Continue to practise a wide range of mental addition strategies, ie. number bonds, adding the nearest multiple of 10, 100, 100 and adjusting, using near doubles, partitioning and recombining.

Subtraction

- Subtract mentally a: **3-digit number and ones, 3-digit number and tens, 3-digit number and hundreds** .
- Estimate answers and use inverse operations to check.
- Solve problems, including missing number problems.
- Find 10 or 100 more or less than a given number.
- Recognise the place value of each digit in a 3-digit number .
- Counting up differences as a mental strategy when numbers are close together or near multiples of 10 (see examples above)
- Read and write numbers up to 1000 in numerals and words.
- Practise mental subtraction strategies, such as subtracting near multiples of 10 and adjusting

Vocabulary

Addition

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

Subtraction

equal to, take, take away, less, minus, subtract, 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 Addition

Mental Strategies

Developing mental fluency with addition and place value involving 3-digit numbers, then establish more formal methods.

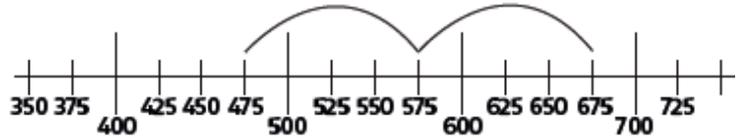
Use empty number lines, concrete equipment (Base 10, beadstrings etc.) to build confidence and fluency in mental addition skills.

Bridge through 10 using known number facts

$$\begin{aligned} 425 + 8 &= 425 + 5 + 3 \\ &= 430 + 3 \\ &= 433 \end{aligned}$$

Counting on in 100s

$$475 + 200 =$$



Number Family

If I know:

$$2 + 3 = 5$$

I also know:

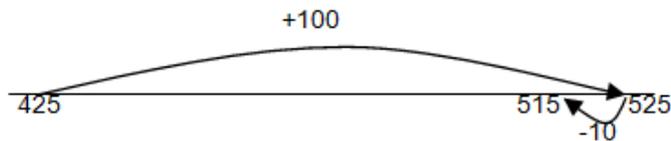
$$3 + 2 = 5$$

$$200 + 300 = 500$$

$$300 + 200 = 500$$

Special Strategy Rounding and adjusting

$$425 + 90 =$$



Written Strategies

Add numbers with up to 3-digits using the expanded column addition method

To support understanding children should physically make and carry out the calculation using base 10, Numicon or other apparatus then compare their practical version with the written form to develop conceptual understanding.

In order to carry out this method of addition:

- Children need to recognise the value of the hundreds, tens and units without recording the partitioning.
- Pupils need to be able to add in columns.
- Start with adding the units, in preparation for the compact method.

| | | | |
|-------|---|---|---|
| | 2 | 3 | 6 |
| + | | 7 | 3 |
| <hr/> | | | |
| | | | 9 |
| | 1 | 0 | 0 |
| | 2 | 0 | 0 |
| <hr/> | | | |
| | 3 | 0 | 9 |

Move to the compact **column addition** method, with “carrying”:

Children who are very secure and confident with 3-digit expanded column addition should be moved onto the **compact column addition** method, being introduced to “carrying” for the first time through the use of base 10. Compare the expanded method to the compact column method to develop an understanding of the process and the reduced number of steps involved.

In order to carry out this method of addition:

- Children need to recognise the value of the hundreds, tens and units without recording the partitioning.
- Record the “carried” digits as their true value underneath the answer section e.g. 100 not 1.
- Cross out the “carries” when they have been added.

| | | | |
|-------|---|---|---|
| | 2 | 7 | 8 |
| + | | 9 | 4 |
| <hr/> | | | |
| | 3 | 7 | 2 |
| | | 1 | 0 |
| | 1 | 0 | 0 |

Mental Strategies

Year 3 Subtraction

Develop mental fluency with subtraction and place value involving 2-digit numbers, then establish more formal methods.

Use empty number lines, concrete equipment (Base 10, beadstrings, Numicon, hundred squares etc.) to build confidence and fluency in mental subtraction skills.

Using Place Value

$$348 - 300 = 48$$

$$456 - 50 = 406$$

Partitioning

Use of practical to consolidate learning
E.g £6.84 - £2.40 as
£6 - £2 and 80p - 40p



Number Facts

Know pairs which total each number to 20

$$20 - 14 = 6$$

Number bonds to 100

$$100 - 35 = 65$$

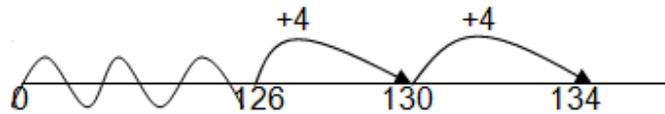


Special Strategy

Counting on

Children are taught to recognise when numbers are close together it is more efficient to count on and find the difference.

$$134 - 126 = 8$$



Bridging through 10

$$136 - 8 =$$

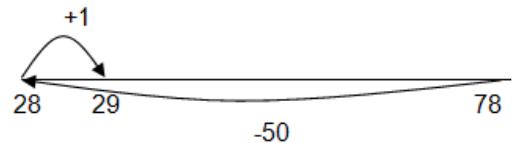
$$136 - 6 (130)$$

$$- 2 = 128$$

Special Strategy

Rounding and adjusting

$$78 - 49 = 29$$



Written Strategies

Subtract with 2 and 3-digit numbers. Introduction of partitioned column subtraction. Continue with counting on for close-together numbers, numbers that are near multiples of 10, 100, 100 or money e.g. calculating change.

Step 1: introduce this method with examples where 'exchanging' is not required

$$89 - 35 = 54$$

$$\begin{array}{r} 80 + 9 \\ - 30 + 5 \\ \hline 50 + 4 \end{array}$$



Step 2: introduce 'exchanging' through practical subtraction. Make the larger number, 72 with Base 10, Numicon, then subtract 47 from it.

$$72 - 47 =$$



$$\begin{array}{r} 60 \\ 70 + 2 \\ - 40 + 7 \\ \hline 20 + 5 = 25 \end{array}$$

Estimate
Calculate
Check it!

When learning to 'exchange', explore partitioning in different ways so that children understand that when you exchange, the value is the same i.e. $72 = 70 + 2 = 60 + 12 = 50 + 22$ etc. Emphasise that the value hasn't changed, we have just partitioned it in a different way.

Step 3: once children are secure conceptually with 'exchanging', they can use the partitioned column method to subtract any 2 and 3-digit numbers.

$$\begin{array}{r} 238 - 146 = 92 \\ \hline 200 + 30 + 8 \\ - 100 + 40 + 6 \\ \hline 0 + 90 + 2 \end{array}$$

Year 4

Addition and Subtraction

Objectives

- 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.

Key Skills

Addition

- Select most appropriate method: mental, jottings or written and explain why.
- Recognise the place value of each digit in a four-digit number.
- Round any number to the nearest 10, 100 or 1000.
- Estimate and use inverse operations to check answers.
- Solve 2-step problems in context, deciding which operations and methods to use and why.
- Find 1000 more or less than a given number.
- Continue to practise a wide range of mental addition strategies, ie. number bonds, add the nearest multiple of 10, 100, 1000 and adjust, use near doubles, partitioning and recombining.
- Add numbers with up to 4 digits using the formal written method of column addition
- Solve 2-step problems in contexts, deciding which operations and methods to use and why.
- Estimate and use inverse operations to check answers to a calculation.

Subtraction

- Subtract by counting on where numbers are close together or they are near to multiples of 10, 100 etc.
- Children select the most appropriate and efficient methods for given subtraction calculations.
- Estimate and use inverse operations to check answers.
- Solve addition and subtraction 2-step problems, choosing which operations and methods to use and why.
- Solve simple measure and money problems involving fractions and decimals to two decimal places.
- Find 1000 more or less than a given number.
- Count backwards through zero, including negative numbers.
- Recognise place value of each digit in a 4-digit number Round any number to the nearest 10, 100 or 1000
- Solve number and practical problems that involve the above, with increasingly large positive numbers.

Vocabulary

Addition

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

Subtraction

equal to, take, take away, less, minus, subtract, 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 Addition

Mental Strategies

Develop confidence at calculating mentally with larger numbers. Using the full range of strategies:

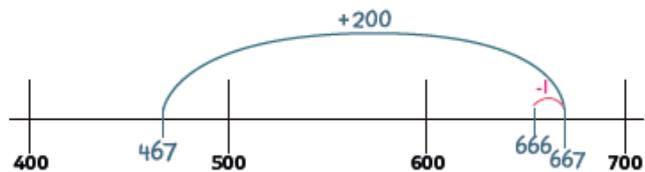
- **Bridging through 60 when calculating with time**
- **Bridging through multiples of 10**
 $425 + 8 = 425 + 5 + 3$
 $= 430 + 3$
 $= 433$

Partitioning
 $167 + 55$ as $167 + 50 = 217$
 $215 + 5 = 222$

Using known facts
Number Family
 If I know:
 $63 + 37 = 100$
 I also know:

Counting on in 1000s, 100s, 10s, 1s
 $3375 + 2000$ as 3475, 4475, 5475

Special Strategy
Rounding and adjusting
 $467 + 199$



Written Strategies

Add numbers with up to 4-digits using the compact column addition method “carrying”

To support understanding children should physically make and carry out the calculation using base 10 or other apparatus then compare their practical version with the written form to develop conceptual understanding. Compare the expanded method to the compact column method to develop an understanding of the process and the reduced number of steps involved.

In order to carry out this method of addition:

- Children need to recognise the value of the hundreds, tens and units without recording the partitioning.
- Record the “carried” digits as their true value underneath the answer section e.g. 100 not 1.
- Cross out the “carries” when they have been added.

| | | | |
|---|--------------|--------------|--------------|
| | 2 | 7 | 8 |
| + | 1 | 9 | 4 |
| | 4 | 7 | 2 |
| | | 1 | 0 |
| | 1 | 0 | 0 |

When children are secure with this method move on to the short hand version of compact column addition. Continue to cross out the carries” when they have been added.

| | | | | |
|---|---|--------------|--------------|---|
| | 1 | 2 | 7 | 8 |
| + | | 1 | 9 | 4 |
| | 1 | 4 | 7 | 2 |
| | | 1 | 1 | |

Year 5

Addition and Subtraction

Objectives

- 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.

Key Skills

Addition

- Add numbers mentally with increasingly large numbers, using and practising a range of mental strategies ie. add the nearest multiple of 10, 100, 1000 and adjust; use near doubles, inverse, partitioning and re-combining; using number bonds.
- Use rounding to check answers and accuracy.
- Solve multi-step problems in contexts, deciding which operations and methods to use and why.
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit.
- Round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000.
- Add numbers with more than 4 digits using formal written method of columnar addition.

Subtraction

- Subtract numbers mentally with increasingly large numbers .
- Use rounding and estimation to check answers to calculations and determine, in a range of contexts, levels of accuracy .
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers to at least 1 million and determine the value of each digit.
- Count forwards or backwards in steps of powers of 10 for any given number up to 1 million.
- Interpret negative numbers in context, counting forwards and backwards with positive and negative integers through 0.
- Round any number up to 1 million to the nearest 10, 100, 1000, 10 000 and 100 000.

Vocabulary

Addition

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

Subtraction

equal to, take, take away, less, minus, subtract, 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 Addition

Mental Strategies

Develop confidence at calculating mentally with larger numbers and decimal numbers. Using the full range of strategies:

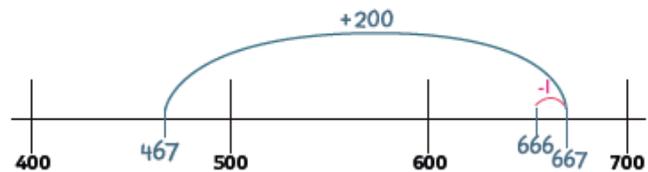
- **Bridging through 60 when calculating with time**
- **Bridging through multiples of 10**
 $425 + 8 = 425 + 5 + 3$
 $= 430 + 3$
 $= 433$

Partitioning
 $2.4 + 5.8$
 as $2 + 5$ and $0.4 + 0.8$
 and combine the totals: $7 + 1.2 = 8.2$

Using known facts
Number Family
 If I know:
 $4 + 3 = 7$
 I also know:
 $0.4 + 0.3 = 0.7$

Counting on
 Add two decimal numbers by adding the 1s, then the 0.1s/0.01s
 e.g. $5.72 + 3.05$ as $5.72 + 3 (8.72) + 0.05 = 8.77$
 Add near multiples of 1
 e.g. $6.34 + 0.99$
 e.g. $5.63 + 0.9$
 Count on from large numbers
 e.g. $6834 + 3005$ as $9834 + 5$

Special Strategy
Rounding and adjusting



Written Strategies

Add numbers with more than 4 digits including money, measures and decimals with different numbers of decimal places.
 To support understanding children should physically make and carry out the calculation using base 10 or other apparatus then compare their practical version with the written form to develop conceptual understanding.

- Numbers should exceed 4 digits.

$$\begin{array}{r} 23,481 \\ + 1,362 \\ \hline 24,843 \end{array}$$

- The decimal point must be aligned
- Cross out the "carries" when they have been added.

| | | | | | |
|---|---|--------------|--------------|--------------|---|
| | £ | 2 | 3 | •5 | 9 |
| + | | £ | 7 | •5 | 5 |
| | £ | 3 | 1 | •1 | 4 |
| | | 1 | 1 | 1 | |

- Pupils should be able to add more than two values, carefully aligning place value columns.
- Empty decimal places can be filled with zero to show the place value in each column.
- Children should understand the place value of tenths and hundredths and use this to align numbers with different numbers of decimal places.

| | | | | | |
|---|--|--------------|--------------|----|---|
| | | 1 | 9 | •0 | 1 |
| | | | 3 | •6 | 5 |
| + | | | 0 | •7 | 0 |
| | | 2 | 3 | •3 | 6 |
| | | 1 | 1 | | |

Mental Strategies

Year 5 Subtraction

Develop mental fluency with subtraction using a range of strategies. Children are encouraged to think about the best method for the numbers involved.

Using Place Value

$$4.58 - 0.08 = 4.5$$

$$6.26 - 0.2 = 6.06$$

Partitioning and counting back

$$3964 - 1051 =$$

$$3964 - 1000 = 2964$$

$$2964 - 50 = 2914$$

$$2914 - 1 = 2913$$

$$5.72 - 2.01 =$$

$$5.72 - 2 = 3.72$$

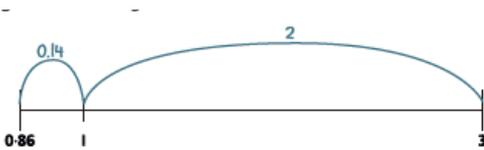
$$3.72 - 0.1 = 3.62$$

Number Facts

Derived facts from number bonds to 10 and 100, and £, £10 and £100

2 - 0.45 using $45 + 55 = 100$

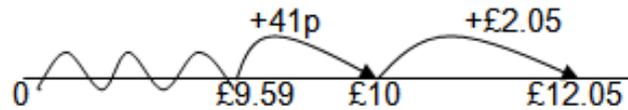
3 - 0.86 using $86 + 14 = 100$



Special Strategy Counting on

Children are taught to recognise when numbers are close together it is more efficient to count on and find the difference.

$$£12.05 - £9.59 = £2.46$$



Bridging through 1, 10, 100, 1000

$$2004 - 9 =$$

$$2004 - 4 = 2000$$

$$2000 - 5 = 1995$$

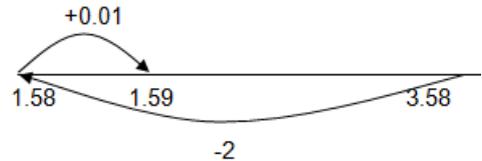
$$8.6 - 0.9 =$$

$$8.6 - 0.6 = 8$$

$$8 - 0.3 = 7.7$$

Special Strategy Rounding and adjusting Near multiples of 10, 100, 1000 or £1

$$3.58 - 1.99 =$$



Written Strategies

Subtract with at least 4-digit numbers including money, measures and decimals.
Compact column method

Subtracting with larger integers. Children who are still not secure with number facts and place value will need to remain on the partitioned column method until they are ready for the compact method.

$$\begin{array}{r} \overset{2}{\cancel{8}} \overset{10}{\cancel{1}} \overset{0}{\cancel{0}} \overset{8}{\cancel{8}} \overset{6}{\cancel{6}} \\ - \quad \quad 2128 \\ \hline 28,928 \end{array}$$

Subtracting with decimals, including mixtures of integers and decimals, aligning the decimal point. Ensure plenty of opportunities for subtracting money and measures. Model using a 'zero' in any empty decimal places to aid layout.

$$\begin{array}{r} \overset{6}{\cancel{7}} \overset{10}{\cancel{1}} \overset{6}{\cancel{6}} \overset{8}{\cancel{8}} \overset{0}{\cancel{0}} \\ - \quad \quad 372.5 \\ \hline 6796.5 \end{array}$$

Estimate
Calculate
Check it!

Year 6

Addition and Subtraction

Objectives

- 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

Key Skills

Addition

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

Subtraction

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers up to 10 million 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.
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

Vocabulary

Addition

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

Subtraction

equal to, take, take away, less, minus, subtract, 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 Addition

Mental Strategies

Develop confidence at calculating mentally with larger numbers and decimal numbers. Using the full range of strategies:

- **Bridging through 60 when calculating with time**
- **Bridging through multiples of 1,10,100**
 $4.85 + 2.36 = 4.85 + 2$
 $= 6.85 + 0.15 + 0.21$
 $= 7.21$

- Counting on**
 Add two decimal numbers by adding the 1s, then the 0.1s/0.01s/0.001s
 e.g. $6.314 + 3.006$ as $6.314 + 3 (9.314) + 0.006 = 9.32$
 Add near multiples of 1
 e.g. $6.345 + 0.999$
 e.g. $5.673 + 0.9$

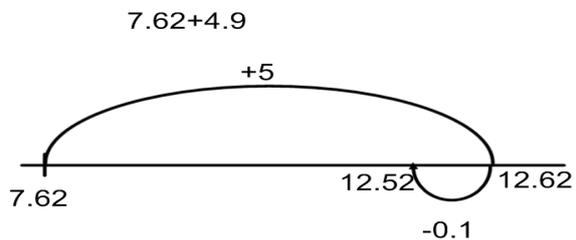
Using place value

Count in 0.1s, 0.01s, 0.001s
 e.g. Know what 0.001 more than 6.725 is
 Partitioning
 e.g. $9.54 + 3.23$ as $9 + 3, 0.5 + 0.2$ and $0.04 + 0.03$, to give 12.77

Using known facts

$63 + 37 = 100$
 $0.63 + 0.37 = 1$

Rounding and adjusting



Written Strategies

Add several numbers of increasing complexity including money, measures and decimals with different numbers of decimal places.

To support understanding children should physically make and carry out the calculation using base 10 or other apparatus then compare their practical version with the written form to develop conceptual understanding.

Adding several numbers with different numbers of decimal places (including money and measures):

- Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically
- Zeros could be used in any empty decimal places, to show there is no value to add.
- Cross out the "carries" when they have been added.

| | | | | | |
|---|--------------|--------------|--------------|---|---|
| | 2 | 3 | • 3 | 6 | 1 |
| | | 9 | • 0 | 8 | 0 |
| + | 5 | 9 | • 7 | 7 | 0 |
| | | 1 | • 3 | 0 | 0 |
| | 9 | 3 | • 5 | 1 | 1 |
| | 2 | 1 | 2 | | |

Adding several numbers with more than 4 digits.

| | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| | 8 | 1 | 0 | 5 | 9 |
| | | 3 | 6 | 6 | 8 |
| | | 1 | 5 | 3 | 0 |
| + | 2 | 0 | 5 | 5 | 1 |
| | 1 | 2 | 0 | 5 | 7 |
| | 1 | 1 | 1 | 1 | |

Mental Strategies

Year 6 Subtraction

Develop mental fluency with subtraction using a wide range of strategies when calculating including decimal and increasingly larger numbers. Children are encouraged to think about the best method for the numbers involved.

Using Place Value

$$7.782 - 0.08 = 7.702$$

$$16.263 - 0.2 = 12.063$$

Partitioning and counting back

$$3964 - 1051 =$$

$$3964 - 1000 = 2964$$

$$2964 - 50 = 2914$$

$$2914 - 1 = 2913 \text{ or}$$

$$5.72 - 2.01 =$$

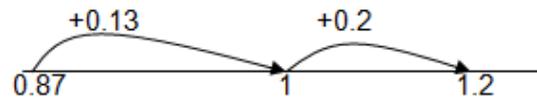
$$5.72 - 2 = 3.72$$

$$3.72 - 0.1 = 3.62$$

Special Strategy Counting on

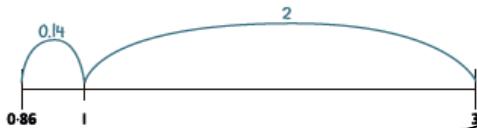
Children are taught to recognise when numbers are close together it is more efficient to count on and find the difference.

$$1.2 - 0.87 = 0.33$$



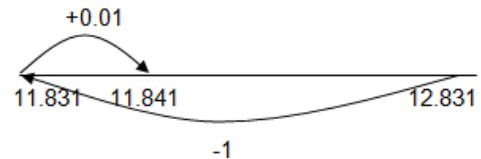
Number Facts

Derived facts from number bonds to 10 and 100, and £, £10 and £100
 $0.1 - 0.075$ using $75 + 25 = 100$
 $5 - 0.65$ using $65 + 35 = 100$
 $£100 - £66.20$ using $20p$ and $80p = £1$
 and $£67 + £33 = £100$



Special Strategy

Rounding and adjusting
 Near multiples of 10, 100, 1000 or £1
 $12.831 - 0.99 = 11.841$



Written Strategies

Subtract with increasingly large and more complex numbers and decimal values .
 Compact column method

Subtracting with more complex integers.

| | | | | | | |
|-------|--------------|--------------|--------------|---|---|---|
| | 9 | 4 | 0 | 6 | 9 | 9 |
| - | | 8 | 9 | 9 | 4 | 9 |
| <hr/> | | | | | | |
| | | 6 | 0 | 7 | 5 | 0 |

Subtracting money

and measures, including decimals with different numbers of decimal places. Empty decimal places can be filled with zero to show the place value in each column.

| | | | | | | | | |
|-------|--------------|--------------|---|---|--------------|---|---|----|
| | 9 | 0 | 5 | . | 4 | 1 | 9 | kg |
| - | | 3 | 6 | . | 0 | 8 | | kg |
| <hr/> | | | | | | | | |
| | | 6 | 9 | . | 3 | 3 | 9 | kg |

Estimate
 Calculate
 Check it!