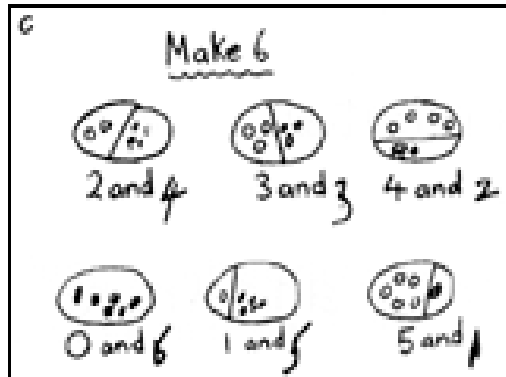


FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Methods:

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They should experience practical calculation opportunities using a wide variety of equipment, e.g. small world play, role play, counters, cubes etc. They develop ways of recording calculations using pictures, etc.



Children **who are ready** may record this as:

$$6 = 2 + 4 \quad 6 = 3 + 3 \quad 6 = 4 + 2 \quad 6 = 0 + 6 \quad 6 = 1 + 5 \quad 6 = 5 + 1$$

Useful Links:

<http://www.tentown.co.uk/Securing Level 1>

Problem Solving Links/Ideas:

<http://www.mathswarriors.co.uk/inv.html>

Common Misconceptions:

*Can only begin counting at one; inaccurately counts objects when rearranged; has no consistent recognition of small numbers of objects; lacks systematic approaches.

* Misunderstands meaning of 'one more'; does not consistently identify the number before or after a given number.

*Does not relate the combining of groups of objects to addition and or does not interpret the counting of all of the objects as an answer to the question 'How many are there altogether?'

Reception

Key Vocabulary:

FS vocabulary for 'calculating' ...

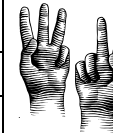
add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more..., how many more to make...?, how many more is... than...? take (away), leave, how many are left/left over?, how many have gone? one less, two less... ten less... how many fewer is... than...? difference between, is the same as add, more, make, sum, and, sum, total, altogether, score

Ideas for assessment questions:

I am going to add one more cube to this set of these four cubes. How many cubes will there be then?



Show me five fingers. Use both hands.



Show me another way to do it.



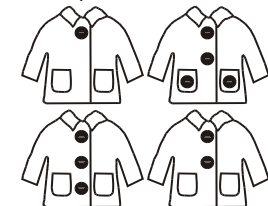
(Count 5 pennies into a purse and shut it. Show 2 more pennies in your hand.) How many pennies are there altogether?

Hop three spaces on this number track. Now hop two more. Where are you now?

Count 5 small toys into this cloth bag. How many objects in the bag? Now count 2 more small toys into the bag. How many small toys in the bag now?

What number is one more than five? You can use the cubes to help you.

(Make a set of jacket cards. Arrange them randomly on a table.



Find two jackets that have four buttons altogether. Are there any other possibilities?

There are four cups on the table. Put two more cups on the table. How many cups altogether are on the table now?

I have two toys in a box. I add four more toys to the box. How many toys are there in the box now?

FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Year 1

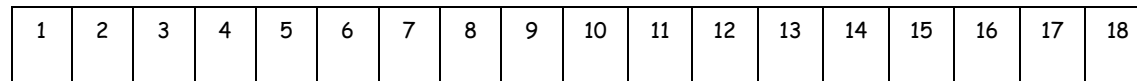
Methods:

Key Vocabulary:

Children will initially use practical equipment to combine groups of objects to find the total. They will move on to the use of number tracks and Base 10 equipment to support their developing understanding of addition. If possible, use two different colours of base 10 equipment so that the initial amounts can still be seen.

problem, solution, calculate, calculation, number sentence, answer, method, explain, money, coin, pence, penny, pound, pay, change, buy, sell, price, spend
 +, add, more, plus make, sum, total, altogether, score, double, near double, one more, two more... ten more, how many more to make...?
 how many more is... than...? how much more is...?=, equals, sign, is the same as

11 + 5 =



11 + 5 = 16

Model of Base 10 equipment

Ideas for assessment questions:

Kay has these coins.



How much money has she altogether?
 Level 2c

There are three people on the bus. One more gets on. How many people are on the bus now?

Use these cubes.
 Show me how to work out the answer.
 [oral question]

Write the total.
 $7 + 3 + 8 + 2 =$

Level 2c
 Write numbers in the shapes to add to 12.

$\square + \triangle = 12$

Write four different numbers to make these correct.

$\square + \triangle = 17$
 $\diamond + \circ = 17$ level 2c

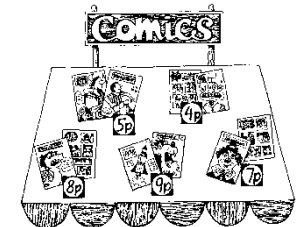
What is fifty-three add ten?
 [oral question]

What is thirty-seven add five?(oral)

Write a number in the box to make this correct.

$2 + 8 = 6 + \square$

Level 2b



Buy 2 different comics and spend 16p. Tick the 2 comics.

Write an addition to show what you did.

Level 1 (oral)

Useful Links:

- [Securing Level 1](#)
- [Securing Level 2](#)
- [Pitch and Expectations Year 1](#)

Common Misconceptions:

Please look at common misconceptions in both reception and Year 2

Problem Solving Links/Ideas:

- [Problem solving \29270-Badger Learning sample pages](#)
- [Problem Solving Years 1-2.pdf](#)

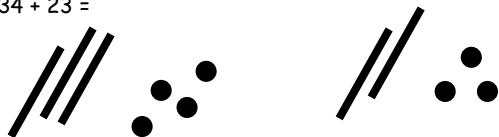
FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Methods:

Children will continue to use the Base 10 equipment to support their calculations. They will record the calculations using their own drawings of the Base 10 equipment (as lines for the 10 rods and dots for the unit blocks)

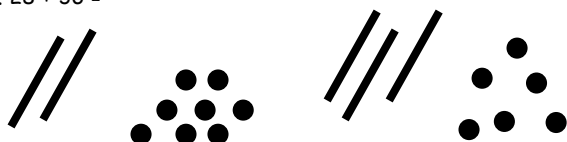
e.g. $34 + 23 =$



$34 + 23 = 57$

They would add the units first and then the tens before combining them.

e.g. $28 + 36 =$



$28 + 36 = 64$

When the units total more than 10, children should be encouraged to exchange 10 ones for 1 ten. This is the start of children understanding 'carrying' in vertical addition.

Useful Links:

[Securing Level 1](#)
[Securing Level 2](#)
[Securing Level 3](#)
[Pitch and Expectations Year 2](#)

Problem solving links/ideas:

[Problem solving \29270-Badger Learning sample pages Problem Solving Years 1-2.pdf](#)

Common Misconceptions

*Makes mistakes when counting using teen numbers and/or crossing boundaries.

*Has difficulty in remembering number pairs totalling between 10 and 20, resulting in calculation errors.

* Is insecure in making links between addition and subtraction and/or recognising inverses.

* Does not readily use number patterns to support calculating, for example:

$46 - 5 = 41$, so

$46 - 15 = 31$,

$46 - 25 = 21$, etc.

Year 2

Key Vocabulary:

calculate, calculation, inverse, answer, explain, method, sign, operation, symbol, number sentence, number line, mental calculation, written calculation, informal method, jottings, diagrams, pictures, images
 +, add, addition, more, plus, make, sum, total
 altogether, score, double, near double, one more, two more... ten more... one hundred more, how many more to make...?, how many more is... than...?, how much more is...? =, equals, sign is the same as, tens boundary, inverse

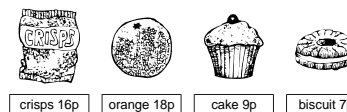
Ideas for assessment questions:

How much money is in the hand?



Level 2b

Janet spent 23p. Put a circle around the 2 items she bought.



She used 3 coins to pay the 23p. Put a circle around each coin she used.



Level 2b

Write four different numbers to make these correct.

$$\square + \triangle = 17$$

$$\diamond + \circ = 17$$

Level 2c

Work out the sum of 13 and 7.

Level 2c [oral]

Add these three numbers: five and five and five.

Level 2c [oral]

Tim is thinking of a number. It is 10 more than 20. What number is Tim thinking of?

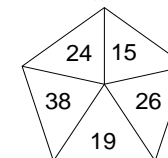
Level 2c [oral]

Write a number in the box to make this correct.

$$2 + 8 = 6 + \square$$

Level 2b

Tick (✓) the two numbers which total 50.



Level 2a

Write the answer.

$$150 + 56 =$$

Level 3

FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Year 3

Methods:

Children will build on their knowledge of using Base 10 equipment from Y2 and continue to use this to support with the transition into a vertical method.

Children should add the **least significant digits** first as preparation for the compact method.

Key Vocabulary:

problem, solution, calculate, calculation, inverse, answer, method, explain, predict, estimate, reason, operation, symbol, number sentence, equation, mental calculation, written calculation, informal method, jottings, number line, pound (£), penny/pence (p), note, coin, units of measurement and their abbreviations

+, add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more... ten more... one hundred more, how many more to make ...?, how many more is... than ...?, how much more is...? =, equals, sign, is the same as ten boundary, hundreds boundary, inverse

Ideas for assessment questions:

Here is a set of stamps.



David posts a parcel. It costs £1.90. He uses two of these stamps. Which two stamps does he use?

Level 3

What is the sum of six, eight and nine?

Level 3 (mental)

What must be added to eighty-three to make one hundred?

Level 3 (mental)

In a large fish tank there are twenty-one red fish and nine blue fish. How many fish are there altogether?

Level 3

Write the missing number in the box
 $456 + \square = 710$

Level 3

What number must I add to thirty-six to make one hundred?

Level 3 (mental)

What is the total of one hundred and twenty and seventy?

Level 3 (mental)

Each side of this square must add up to 80.

Write in the missing numbers.

30	40	
		50
20	40	20

Level 3

TU

$$\begin{array}{r} + 24 \\ 11 \text{ (} 7 + 4 \text{)} \\ \hline 80 \text{ (} 60 + 20 \text{)} \\ \hline 91 \end{array}$$



HTU

$$\begin{array}{r} 267 \\ + 85 \\ \hline 12 \text{ (} 7 + 5 \text{)} \\ 140 \text{ (} 60 + 80 \text{)} \\ \hline 200 \\ \hline 352 \end{array}$$

The Base 10 equipment should be used alongside to model the transition to the vertical method but this should not be recorded by the children.

NB The text in italics is modelled by the teacher but may not be written by pupil in their answer.

Useful Links:

[Springboard 3](#)
[Securing Level 3](#)
[Securing Level 2](#)
[Pitch and Expectations Year 3](#)

Common Misconceptions:

Please look at common misconceptions in both Year 2 and year 4.

Problem solving links/ideas:

FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Year 4

Methods:

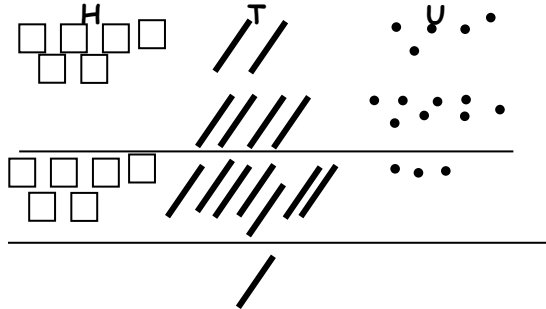
Key Vocabulary:

Based on their experiences in Y3, children will then begin to carry below the line.

The best way to model this would be using Base 10 equipment to show how units would transfer to tens.

HTU

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$$



Teacher model

$$\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$$

$$\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$$

$$\begin{array}{r} 321 \\ + 7 \\ + 48 \\ \hline 376 \end{array}$$

$$\begin{array}{r} £3.48 \\ + £0.78 \\ \hline £4.26 \\ 11 \end{array}$$

Using similar methods, children will:

- add several numbers with different numbers of digits;
- begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;
- know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.

calculate, calculation, equation, operation, symbol, inverse, answer, method, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius
add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make...? is the same as, equals, sign
tens boundary, hundreds boundary, inverse

Ideas for assessment questions:

How much must I add to four pounds ninety to make six pounds?
Level 3 (mental)

Emma is 21 years old today. Her father is 24 years older. How old is Emma's father?

Level 3 (mental)

In a bag there are eighty-one red counters and thirty-seven yellow counters. How many counters are there altogether?

Add together thirty-eight, twenty-three and forty-four.

Level 3 (metal)

Level 3 (mental)

These are the prices of sandwiches, drinks and fruit.

Write what the two missing digits could be

$$\square 62 + \square 95 = 757$$

Level 4 (mental)

	Sandwiches	Drinks	Fruit
ham	£1.45	milk 55p	apple 15p
tuna	£1.70	cola 45p	pear 20p
salad	£1.20	juice 65p	melon 25p

Add together fifty-three, fifty-five and fifty-seven.

Level 3 (mental)

Useful Links:

Common Misconceptions:

- [Springboard 4](#)
- [Securing level 4](#)
- [Securing Level 3](#)
- [Securing Level 2](#)
- [Pitch and Expectations Year 4](#)

[*Has insecure understanding of the structure of the number system, resulting in addition and subtraction errors and difficulty with estimating.](#)

[*Has difficulty in partitioning, for example, 208 into 190 and 18 and 31 into 20 and 11.](#)

[*Does not make sensible decisions about when to use calculations laid out in columns.](#)

[*Has difficulty with adding three numbers in a column, except by adding the first two and then the last one.](#)

Problem solving links and ideas:

Shereen buys a tuna sandwich, milk and a pear. How much does she pay?

Mike has 80p to spend on a fruit and a drink. What two things can he buy for exactly 80p?

Level 3

Calculate $584 + 79$.

Level 3

The table shows the cost of coach tickets to different cities.

		Hull	York	Leeds
Adult	single	£12.50	£15.60	£10.25
	return	£23.75	£28.50	£19.30
Child	single	£8.50	£10.80	£8.25
	return	£14.90	£17.90	£14.75

What is the total cost for a return journey to York for one adult and two children?

How much more does it cost for two adults to make a single journey to Hull than to Leeds?

Level 4

FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Year 5

Methods:

Children should extend the carrying method to numbers with at least four digits.

$$\begin{array}{r} 587 \\ + 475 \\ \hline 1062 \\ 1 \ 1 \end{array} \qquad \begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 1 \ 1 \ 1 \end{array}$$

$$\begin{array}{r} 3121 \\ + 37 \\ + 148 \\ \hline 3306 \\ 1 \ 1 \end{array} \qquad \begin{array}{r} 3.20 \\ + 2.88 \\ \hline 6.08 \\ 1 \end{array}$$

Using similar methods, children will:

- add several numbers with different numbers of digits;
- begin to add two or more decimal fractions with up to three digits and the same number of decimal places;
- know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m + 280 cm.

Useful Links:

[Springboard 5](#)
[Securing Level 4](#)
[Securing Level 3](#)
[Pitch and Expectations Year 5](#)

Problem Solving Ideas:

Please look at common misconceptions in both Year 4 and Year 6

Useful Videos:

Key Vocabulary

calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius

add, addition, more, plus, increase, sum, total, altogether
 score, double, near double, how many more to make...? equals, sign, is the same as, tens boundary, hundreds boundary, units boundary, tenths boundary, inverse

Ideas for assessment questions:

What number is one hundred and ninety-nine more than four hundred and twenty-eight.

Level 4 (mental)

The table shows the cost of coach tickets to different cities.

		Hull	York	Leeds
Adult	single	£12.50	£15.60	£10.25
	return	£23.75	£28.50	£19.30
Child	single	£8.50	£10.80	£8.25
	return	£14.90	£17.90	£14.75

What is the total cost for a return journey to York for one adult and two children?

How much more does it cost for two adults to make a single journey to Hull than to Leeds?

Level 4

Write a number in the box to make this correct.

$$6.45 = 6 + 0.4 + \square$$

These tins show the amounts collected for a charity.



What was the total amount collected?

Level 3

Add three point five to four point eight.

Level 4

Write in the missing digits.

$$\begin{array}{r} 2 \square 8 \\ + 29 \square \\ \hline 555 \end{array}$$

Level 4

Write the same number in each box to make this correct.

$$\square + \square + \square = 10.5$$

Level 4

FEATHERSTONE ACADEMY

Progression through calculations for ADDITION

Year 6

Methods:

Key Vocabulary:

Children should extend the carrying method to number with any number of digits.

FS vocabulary for 'calculating' ...

$\begin{array}{r} 7648 \\ + 1486 \\ \hline 9134 \\ 1\ 11 \end{array}$	$\begin{array}{r} 6584 \\ + 5848 \\ \hline 12432 \\ 1\ 11 \end{array}$	$\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ \hline + 4681 \\ 11944 \\ 1\ 2\ 1 \end{array}$	$\begin{array}{r} 401.20 \\ + 26.85 \\ \hline + 0.71 \\ \hline 428.76 \\ 1 \end{array}$
---	--	--	---

add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more..., how many more to make... ?, how many more is... than...? take (away), leave, how many are left/left over? ,how many have gone? one less, two less... ten less... how many fewer is... than...? difference between, is the same as
add, more, make, sum, and, sum, total, altogether, score

Using similar methods, children will

- add several numbers with different numbers of digits;
- begin to add two or more decimal fractions with up to four digits and either one or two decimal places;
- know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. $401.2 + 26.85 + 0.71$.

Ideas for assessment questions:

Write a number in the box to make this correct.

$$0.627 = 0.6 + 0.02 + \square$$

What is the sum of eight point five and eight point six?

Level 4 (mental)

Tick (✓) the two numbers which have a total of 10.

0.01	0.11	1.01
9.09	9.9	9.99

Level 4

Useful Links:

Common Misconceptions

[Springboard 6](#)
[Securing Level 5](#)
[Securing Level 4](#)
[Securing level 3](#)
[Pitch and Expectations Year 6](#)

*Has inefficient counting strategies and/or insecure understanding of the number system.

*Rounding inaccurately, particularly when decimals are involved, and having little sense of the size of the numbers involved.

Problem solving links/ideas

*Has difficulty in partitioning numbers with zero place holders and/or numbers less than one, for example partitioning 0.45 as 0.4 and 0.05.

*Has difficulty in choosing suitable methods for calculations that cross boundaries: addition

Circle two numbers which add to make 0.12.

0.1 0.5 0.05 0.7 0.07 0.2

In the chart any three numbers in a line, across or down, have a total of 18.45. Write the missing number.

2.46	8.61	7.38
11.07	□	1.23
4.92	3.69	9.84

Level 4 (mental)

Write in the missing digits

$$4\square4 + 38\square = 851$$

Level 4

Add three point five to four point eight.

Level 4 (mental)

Circle the two numbers which add up to 1.

0.1 0.65 0.99 0.45 0.35

Level 5

Each shape stands for a number. The numbers shown are the totals of the line of four numbers in the row or column.

▲	♣	▲	○	
♣	○	♣	▲	25
○	○	○	○	20
▲	♣	♣	▲	
□	□	□	26	

Find the remaining totals

PROGRESSION THROUGH CALCULATIONS FOR ADDITION

- These standards are age-related expectations and therefore we expect the majority of children to achieve them.
- New learning is likely to be taught to groups rather than the whole class to acknowledge the different learning stages of the children.
- Children should understand that addition is commutative and therefore calculations can be rearranged, e.g. $4 + 13 = 17$ is the same as $13 + 4 = 17$.
- Ensure that children understand the = sign means is the same as, not makes, and that children see calculations where the equals sign is in a different position, e.g. $3 + 2 = 5$ and $5 = 3 + 2$.
- Children should be encouraged to approximate before calculating and check whether their answer is reasonable.

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

- 1) they are not ready.
- 2) they are not confident.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods