

# FEATHERSTONE ACADEMY

## Progression through calculations for SUBTRACTION

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  $8 - 5 = 3$

## Reception

Key Vocabulary:

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

### Ideas for assessment questions:

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

---

There are nine biscuits on this plate. Take three of the biscuits to eat. How many biscuits are left on the plate?

---

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

Find all the dominoes that have a total of six spots.

---

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?

---

Show me 5 fingers on one hand. Show me 2 fingers on the other hand. How many fingers altogether?

Useful Links:

<http://www.tentown.co.uk/>

Common Misconceptions:

[\\*Misunderstands meaning of 'one more' and 'one less': does not consistently identify the number before or after a given number.](#)

\*Is not confident about when to stop counting when taking away (subtracting) in answer to the question 'How many are left?'

Problem Solving Links/Ideas:

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

We have four easels. There are seven children who want to paint. How many more easels do we need?

---

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

---

Start with two. Hold it in your head. Count on to five.

---

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

---

John has four books. Lisa has one book. How many more books has John than Lisa?

---

Here are five toy cars. How many more cars are needed to make a set of eight cars?

I have hidden two cubes in this box. There are three cubes on the table. How many cubes are there altogether?

---

There are six toys in a box. I take away three of the toys. How many toys are left in the box?

---

How many grey rabbits are there?  
How many white rabbits are there?  
How many rabbits are there altogether?

What is the difference between the number of grey rabbits and the number of white rabbits?

# FEATHERSTONE ACADEMY

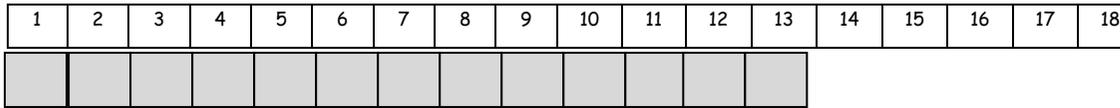
## Progression through calculations for SUBTRACTION

**Year 1**

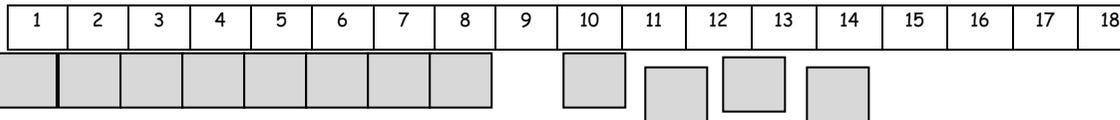
Methods:

Key Vocabulary:

Children will use practical equipment for subtraction by taking away (counting back).  $13 - 5 =$



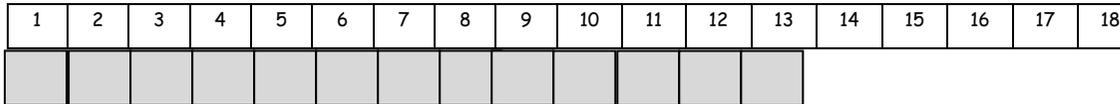
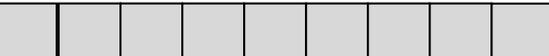
Count out 13 cubes along the number track followed by removal of 5 cubes to give answer:



$13 - 5 = 8$  It is important that children keep track of how many have been removed.

**Subtraction as finding the difference**

Children should be shown that finding the difference is linked to subtraction and the teacher should ensure the children know that it is an appropriate strategy to use when the numbers are close together.



To find the difference, children need to identify how to make the two amounts the same. This should be by adding cubes onto the smaller amount, one at a time, until it is the same size as the larger amount. As each cube is added the children count how many they are adding on.

*NB - It is useful to present the context of difference in real life contexts such as comparing two measurements or when interpreting block graphs.*

Useful Links:

Common Misconceptions:

Please see common misconceptions from reception and Year 2.

Problem Solving Links/Ideas:

<http://nrich.maths.org/8937>  
<http://nrich.maths.org/8296>

problem, solution, calculate, calculation, number sentence, answer, method, explain, money, coin, pence, penny, pound, pay, change, buy, sell, price, spend how many more to make...? how many more is... than...? how much more is...? -, subtract, take (away), minus, leave, how many are left/left over? how many are gone? one less, two less, ten less... how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as

**Ideas for assessment questions:**

I'm giving each of you two number cards [from 0 to 5].

What is the difference between your two numbers?

Level 1 (oral)

15 ducks are on the pond. 11 of them go away. How many are left?

Level 2c

What is the difference between twelve and sixteen?

Level 2b (oral)

What is left if five is subtracted from twelve? Level 2 (mental)

Work out the difference between 80 and Level 2a

Find the answer.  $72 - 8 =$  Level 2c

Write the answer.  $65 - 40 =$  Level 2c

Look at the numbers. 15 7 16 8  
 Use two of these numbers to make this correct.  $\square - \square = 7$

Level 2c

Write a number in the box to make this correct.

$16 - \square = 10$

Level 2c

Write the answer.

$25 - 12 =$

Level 2c

Match each subtraction to its answer.

$16 - 6$	8
$15 - 10$	9
$19 - 11$	13
$18 - 9$	10
	5

Level 2c

# FEATHERSTONE ACADEMY

## Progression through calculations for SUBTRACTION

Methods:

Children will move on to using the Base 10 equipment to support their calculations. They need to understand that the number being subtracted does not appear as an amount on its own, but rather as part of the larger amount.

e.g.  $39 - 17 =$

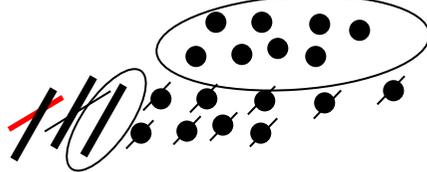


Children would count out 39 using the Base 10 equipment (3 tens and 9 units) and would remove 7 units and then one ten, counting up the answer of 2 tens and 2 units to give 22.

Circling the tens and units that remain will be modelled by the teacher but does not have to be written by pupil in their answer.

When exchange is required

e.g.  $37 - 19 =$



Children can see that there are not enough units available to subtract 9 units so they need to exchange a ten for 10 units.

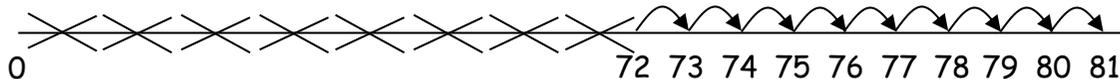
Children would count out how many tens and units are left to give the answer (18).

At the end of Y2, children will be encouraged to record this by drawing representations of the Base 10 material and crossing out those pieces that they are subtracting. If children are representing exchange, they should be encouraged to cross out a 10 rod line in a different colour (red in the example above, to avoid confusion between the exchange and the subtraction) and replace with 10 unit dots.

Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc., children should be encouraged to recognise that it is more efficient to find the difference by counting up using a number line to support the mental calculation. Initially, 0 should be included on the number line to demonstrate that this portion (from 0-72) has been removed, which is similar to the process of taking away.

e.g.  $81 - 72 =$



Help children to become more efficient with counting on by subtracting the units in one jump.

Useful Links:

Common Misconceptions:

- [\\*Counts up unreliably; still counting the smaller number to get one too many in the answer.](#)
- [\\*Does not relate finding a difference and complementary addition to the operation of subtraction.](#)
- [\\*Is insecure in making links between addition and subtraction and/or recognising inverses.](#)

Problem Solving Links/Ideas:

- <http://nrich.maths.org/8937>
- <http://nrich.maths.org/8296>

## 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  
 how many more to make...? how many more is... than...? how much more is...? -, subtract, take away minus leave how many are left/left over? one less, two less... ten less... one hundred less, how many less is... than...?  
 how much fewer is...? difference between, half, halve =, equals, sign, is the same as, tens boundary

### Ideas for assessment questions:

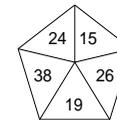
Find the answer.  $72 - 8 =$

Level 2c

Write the answer.  $30 - 15 =$

Level 2b

Tick (✓) the two numbers which total 50. Level 2a



Write the answer  $79 - 34 =$

Level 2a

Write the answer.  $82 - 45 =$

Level 3

Write the answer.  $63 - 37 =$

Level 3

Work out the difference between 46 and 18.

Level 3

What is twenty-seven subtract nine?  
Level 3 (mental)

Write numbers in the boxes to make this correct.  $13 + \square + \square = 23$

Level 2c

Look at these signs. + × - =  
Use one of the signs to make this correct.  $9 \square 2 = 11$

Now use the signs to make this one correct.  $14 \square 2 \square 12$

Level 2c

Write the number which is 11 less than 40.

Level 2a

# FEATHERSTONE ACADEMY

## Progression through calculations for SUBTRACTION

Year 3

Methods:

Key Vocabulary:

Children should begin the method of expanded decomposition with, initially, TU - TU calculations. This process should be demonstrated using arrow cards to show the partitioning and Base 10 materials to show the decomposition of the number.

When solving the calculation  $89 - 57$ , children need to understand that the number being subtracted (57) does not appear as an amount on its own, but rather as part of the larger amount. Therefore, when using Base 10 materials, children would need to count out only the 89.

$$\begin{array}{r}
 89 = \\
 - 57 \\
 \hline
 \end{array}
 =
 \begin{array}{r}
 80 \rightarrow 9 \\
 50 \rightarrow 7 \\
 30 \rightarrow 2 = 32
 \end{array}$$

The calculation should be read as subtract 7 from 9 or 9 subtract 7.

Children should use the Base 10 materials to represent the first number and remove the units and tens as appropriate (as with the more informal method in Y2).

Initially, the children will be taught using examples that do not need the children to exchange. Emphasise that the bottom number is being subtracted from the top number rather than the smaller number from the bigger.

From this the children will begin to solve problems which involve exchange:

$$\begin{array}{r}
 71 \\
 - 46 \\
 \hline
 \end{array}$$

Step 1

The calculation should be read as subtract 6 from 1 or 1 subtract 6.

Children can see that there are not enough units to subtract 6 units so they need to exchange a ten for ten units. This will become:

$$\begin{array}{r}
 60 \rightarrow 11 \\
 -40 \rightarrow 6 \\
 20 \rightarrow 5 = 25
 \end{array}$$

Children should know that units line up under units, tens under tens,

This would be recorded by the children as

$$\begin{array}{r}
 60 \\
 -40 \rightarrow 6 \\
 20 \rightarrow 5 = 25
 \end{array}$$

### Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc., children should be

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  
 how many more to make ...? how many more is... than ...? how much more is...? -, subtract, take (away), minus, leave, how many are left/left over? one less, two less... ten less... one hundred less, how many fewer is... than ...? how much less is...? difference between half, halve =, equals, sign, is the same as tens boundary, hundreds boundary

### Ideas for assessment questions:

What is twenty-seven subtract nine?

Level 3 (mental)

Subtract thirty-two from seventy.

Level 3 (mental)

The difference between a number and twenty-nine is ten. What could the number be?

Level 3 (mental)

In a class there are thirty-two children. If there are twenty-three girls, how many boys are there?

Level 3

Write in the missing numbers.

$$60 - \square = 26$$

Level 3

Write the answer.  $176 - 49 =$

Level 3

Write in the missing number.

$$120 - 51 = \square$$

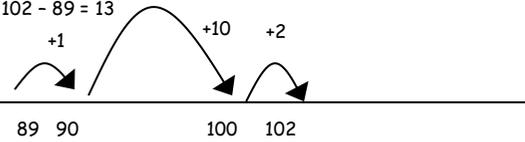
Level 3

Work out the difference between 147 and 205.



encouraged to recognise that it is more efficient to find the difference by counting up using a number line to support the mental calculation.

e.g.  $102 - 89 = 13$



Help children to become more efficient with counting on by:

- Subtracting the units in one jump;
- Subtracting the tens in one jump and the units in one jump.

Useful Links:

Common Misconceptions:

Please see common misconceptions from Year 2 and Year 4

Problem Solving Links/Ideas:

In a class of thirty-two children, fourteen walked to school and the rest came by bus. How many came by bus?

Level 3

30	40	
		50
20	40	20

Each side of this square must add up to 80. Write in the missing numbers

Level 3

Write the answer in the box.

Level 3

Calculate  $309 - 198$ .

Level 3

Write the answer.  $1000 - 143 =$

Level 3

# FEATHERSTONE ACADEMY

## Progression through calculations for SUBTRACTION

## Year 4

Methods:

Key Vocabulary:

$$\begin{array}{r} 754 \\ - 86 \\ \hline \end{array}$$

Step 1

$$\begin{array}{r} 700 \rightarrow 50 \rightarrow 4 \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline \end{array}$$

NB. Children, who still need support from base 10 equipment, should be using it alongside the formal written method.

Step 2

$$\begin{array}{r} 700 \rightarrow 40 \rightarrow 14 \quad (\text{adjust from } T \text{ to } U) \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline \end{array}$$

Step 3

$$\begin{array}{r} 600 \rightarrow 140 \rightarrow 14 \quad (\text{adjust from } H \text{ to } T) \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline 600 \rightarrow 60 \rightarrow 8 = 668 \end{array}$$

This would be recorded by the children as

$$\begin{array}{r} \cancel{600} \rightarrow \cancel{140} \rightarrow 14 \\ - \quad \quad \quad 80 \rightarrow 6 \\ \hline 600 \rightarrow 60 \rightarrow 8 = 668 \end{array}$$

Children should:

- be able to subtract numbers with different numbers of digits;
- using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;
- know that decimal points should line up under each other.

For example:

$$\begin{array}{r} \pounds 8.95 = \\ - \pounds 4.38 \\ \hline \end{array}$$

$$\begin{array}{r} 8.00 \rightarrow 0.90 \rightarrow 0.05 \\ - 4.00 \rightarrow 0.30 \rightarrow 0.08 \\ \hline 4.00 \rightarrow 0.50 \rightarrow 0.07 = \pounds 4.57 \end{array} \quad (\text{adjust from } T \text{ to } U)$$

This would be recorded by the children as:

$$\begin{array}{r} 0.80 \quad 0.15 \\ 8.00 \rightarrow \cancel{0.90} \rightarrow 0.05 \\ \hline -4.00 \rightarrow 0.30 \rightarrow 0.08 \\ \hline 4.00 \rightarrow 0.50 \rightarrow 0.07 = 668 \end{array}$$

### Subtraction as finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up using a number line to support the mental calculation.

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  
 how many more to make...? subtract, subtraction, take away, minus, decrease, leave, how many are left/left over? difference, between, half, halve, how many more/fewer is... than...? how much more/less is...? is the same as, equals, sign, tens boundary, hundreds boundary, inverse

### Ideas for assessment questions:

How many less than forty-one is seventeen?  
Level 3

Jenny thought of a number.  
She doubled it and then added four. The answer was eighty-eight. Which number did she think of?  
Level 4 (mental)

Subtract one hundred and five from two hundred.  
Level 3 (mental)

Calculate the difference between five hundred and two hundred and thirty.  
Level 4 (mental)

Calculate 309 - 198.  
Level 3

Calculate 137 - 65.  
Level 3

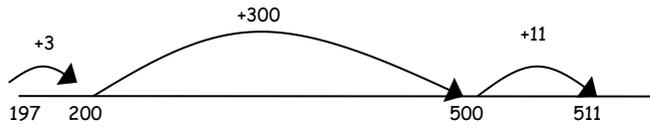
Calculate 438 - 296.  
Level 4

Calculate 808 - 512.  
Level 4



A shop sells three types of sunglasses.  
What is the difference in price between the most expensive and least expensive sunglasses?  
Level 4

e.g.  $511 - 197 = 314$



Help children to become more efficient with counting on by:

- Subtracting the units in one jump;
- Subtracting the tens in one jump and the units in one jump;
- Subtracting the hundreds in one jump, the tens in one jump and the units in one jump.

Useful Links:

Common Misconceptions:

[\\*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.](#)

Problem Solving Links/Ideas:

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

# FEATHERSTONE ACADEMY

## Progression through calculations for SUBTRACTION

## Year 5

Methods:

Key Vocabulary:

**NB** If children have not reached the stage of compact method of decomposition then they will continue at this point with the expanded method.

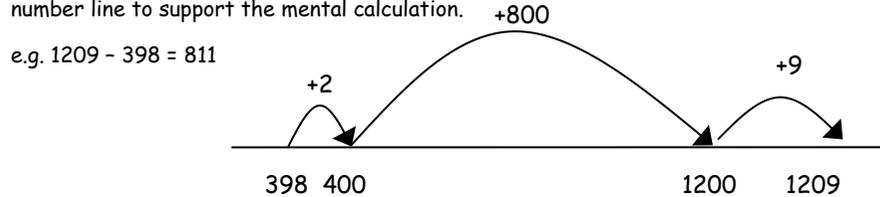
calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius  
 how many more to make...? subtract, subtraction, take (away) minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/ fewer is... than...? how much more/less is...? equals, sign, is the same as, tens boundary, hundreds boundary, units boundary, tenths boundary, inverse,

$$\begin{array}{r} 6141 \\ 174 \\ - 286 \\ \hline 1468 \end{array} \qquad \begin{array}{r} 2131 \\ 3.42 \\ - 1.76 \\ \hline 1.66 \end{array}$$

Children should:

- be able to subtract numbers with different numbers of digits;
- begin to find the difference between two decimal fractions with up to three digits and the same number of decimal places;
- know that decimal points should line up under each other.

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc., children should be encouraged to recognise that it is more efficient to find the difference by counting up using a number line to support the mental calculation.



### Ideas for assessment questions:

What number is two less than nine hundred and one?

Level 3 (mental)

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

Level 4 (mental)

What is one thousand minus one hundred and ten?

Level 3 (mental)

What is three thousand subtract ten?

Level 3 (mental)

What is the difference between one thousand nine hundred and ninety-four and four

Calculate  $1025 - 336$ .

Level 4

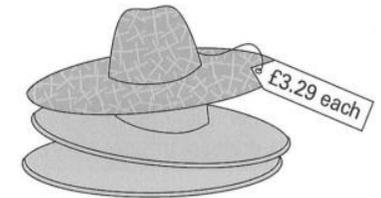
Calculate  $6247 - 2752$ .

Level 4

Calculate  $13.6 - 2.8$

Level 4

A shop sells sun hats.



Ryan buys some sunglasses for £4.69 and a sun hat. How much change does he get from £10?

Level 4

Useful Links:

Common Misconceptions:

Please see common misconceptions from Year 4 and Year 6.

Problem Solving Links/Ideas:

		thousand and three? Level 4 (mental)	
		Calculate 143.6 - 52.85 Level 5	

## FEATHERSTONE ACADEMY

<b>Progression through calculations for SUBTRACTION</b>		<b>Year 6</b>										
Methods:		Key Vocabulary:										
$\begin{array}{r} \phantom{0}5\phantom{0}1\phantom{0}3\phantom{0}1 \\ 1\cancel{6}A67 \\ - 2,684 \\ \hline 13,783 \end{array}$ <p><i>Children should:</i></p> <ul style="list-style-type: none"> <li>• be able to subtract numbers with different numbers of digits;</li> <li>• be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;</li> <li>• know that decimal points should line up under each other.</li> </ul> <p>If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, children should be encouraged to recognise that it is more efficient to find the difference by counting up using a number line to support the mental calculation.</p> <p>e.g. <math>3002 - 1997 = 1005</math></p>		<p>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</p> <p>how many more to make...? subtract, subtraction, take (away) minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/ fewer is... than...? how much more/less is...? equals, sign, is the same as, tens boundary, hundreds boundary, units boundary, tenths boundary, inverse,</p> <p><b>Ideas for assessment questions:</b></p> <p>Subtract one point nine from two point seven. Level 4 (mental)</p> <hr/> <p>Subtract nought point seven five from six. Level 4 (mental)</p> <hr/> <p>In a café I buy two cups of coffee and a sandwich. Altogether I pay three pounds. The sandwich costs one pound sixty. What is the cost of one cup of coffee? Level 5</p> <hr/> <p>A packet of crisps costs thirty-two pence. Josh buys three packets. How much change does he get from one pound?</p>										
Useful Links:		Common Misconceptions:										
		<p>Calculate 15.05 - 14.84. Level 5</p> <hr/> <p>Calculate 8.6 - 3.75. Level 5</p> <hr/> <p>In the chart any three numbers in a line, across or down, have a total of 18.45. Write the missing number.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">2.46</td> <td style="text-align: center;">8.61</td> <td style="text-align: center;">7.38</td> </tr> <tr> <td style="text-align: center;">11.07</td> <td style="text-align: center;">□</td> <td style="text-align: center;">1.23</td> </tr> <tr> <td style="text-align: center;">4.92</td> <td style="text-align: center;">3.69</td> <td style="text-align: center;">9.84</td> </tr> </table> <p style="text-align: center;">Level 4</p>		2.46	8.61	7.38	11.07	□	1.23	4.92	3.69	9.84
2.46	8.61	7.38										
11.07	□	1.23										
4.92	3.69	9.84										

	<p><u>*Rounding inaccurately, particularly when decimals are involved, and having little sense of the size of the numbers involved.</u></p> <p><u>*Has difficulty in choosing suitable methods for calculations that cross boundaries: subtraction.</u></p>	<p>Level 4</p> <hr/> <p>A magazine costs one pound forty pence. I buy two of them and pay with a five pound note. How much change should I get? Level 4 (mental)</p>	
<p>Problem Solving Links/Ideas:</p>			

The test questions above refer to general subtraction, however pupils will also be required to solve both mental and written subtraction calculations in a range of contexts and using negative numbers. E.g.

The temperature starts at four degrees and goes down by ten degrees. What is the temperature now?  
Level 4 (mental)

The temperature in York is 4°C. Rome is 7 degrees colder than York. What is the temperature in Rome?  
Level 4

Note the use of the word 'colder' here to indicate a decrease in temperature, compared to 'goes down' in the previous question.

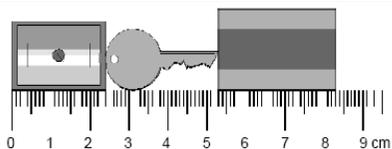
Megan makes a sequence of numbers starting with 100. She subtracts 45 each time. Write the next two numbers in the sequence.  
100 55 10    
Level 5

Here the subtraction extends to negative numbers for both parts of the answer. Pupils are required to subtract an integer from a positive number where the answer is negative and also to subtract an integer from a negative number, where the answer is obviously negative.

Circle two numbers which have a difference of 2  
-1   -0.5   0   0.5   1   1.5  
Level 4

Note the question does not ask 1 - 2 or 1.5 - 2.

Here is a pencil sharpener, a key and a rubber. What is the length of all 3 things together? Give your answer in millimetres. What is the length of the key? Give your answer in millimetres.



## PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

- 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 subtraction is the removing or taking away one quantity from another (not necessarily the smaller number from the larger one) or finding the difference between two separate quantities.
- Children should understand that, unlike addition, subtraction is **not** commutative.
- 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.  $9 - 5 = 4$  and  $4 = 9 - 5$ .
- 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.