Calculation policy: Subtraction

PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

All of the mental methods below need to be taught to the children explicitly. Children will need to see or draw models to show their understanding when they are learning these methods.

Year 1

Mental recall of addition and subtraction facts

10 – 6 = 4	17 - □ = 11
20 - 17 = 3	10 - □ = 2

Year 2

Find a small difference by counting up

82 – 79 = 3

Year 3

Counting back in repeated steps of 1, 10, 100, 1000 – This will show children's understanding of place value very quickly.

86 - 52 = 34 (by counting back in tens and then in ones)
460 - 300 = 160 (by counting back in hundreds)

Year 4

Subtract the nearest multiple of 10, 100 and 1000 and adjust

24 - 19 = 24 - 20 + 1 = 5
458 - 71 = 458 - 70 - 1 = 387

Use the relationship between addition and subtraction

36 + 19 = 55	19 + 36 = 55
55 – 19 = 36	55 – 36 = 19

Many mental calculation strategies will continue to be used. They are not replaced by written methods.

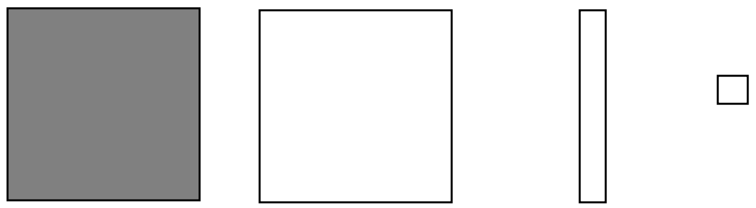
Children should not be made to go onto the next stage if:

1) **They are not ready.**
2) **They are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after the calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Children should:

✓ *be able to subtract numbers with different numbers of digits;*
✓ *be able to subtract two or more decimal fractions with up to three digits and either one or two or three decimal places;*
✓ *know that decimal points should line up under each other.*



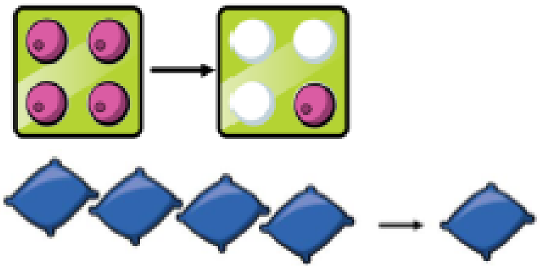
thousand hundred ten one

Subtraction – Early Years

Concrete:

Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).

4 – 3 = 1



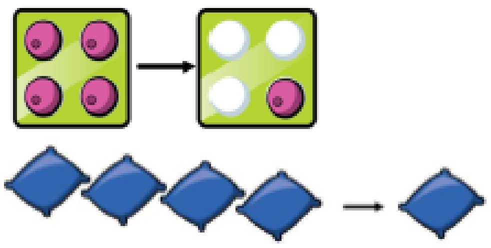
A good reference point for early number is https://gfletchy.com/progression-videos/
To be successful in maths, children need to understand how smaller numbers are made up.

Subtraction – Year 1
Subtracting by crossing out.

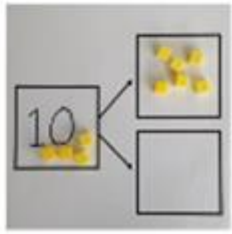
Concrete:

Physically taking away and removing objects from a whole (ten frames, Numicon, cubes and other items such as beanbags could be used).

4 – 3 = 1

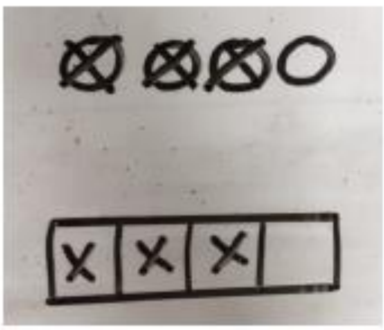


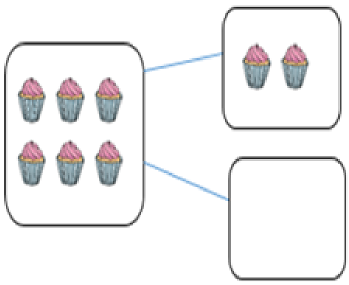
Eventually, lining up the 'whole' in cubes and then taking them away is a good way of children being able to relate subtraction back to addition. My whole is…. One part it….(what is taken away) The other part is… (what is left)



Pictorial:

Children to draw the concrete resources they are using and cross out the correct amount. The bar model can also be used.

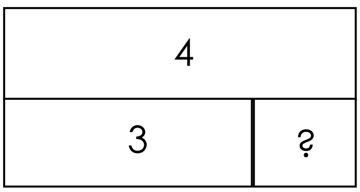


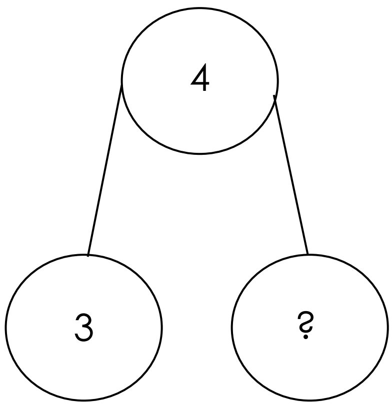


Drawing whole part models could be the next step before using number as labels.

Abstract:

4 – 3 = ?





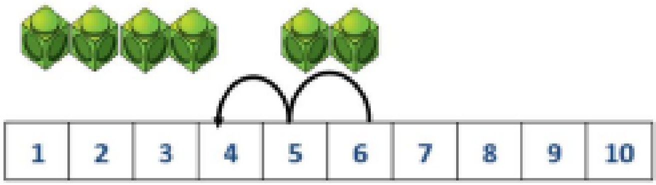
Subtraction – Year 1
Subtracting by counting back

https://mathsframe.co.uk/en/resources/resource/450/ITP-Number-Line

Concrete:

Counting back (using number lines or number tracks) children start with 6 and count back 2.

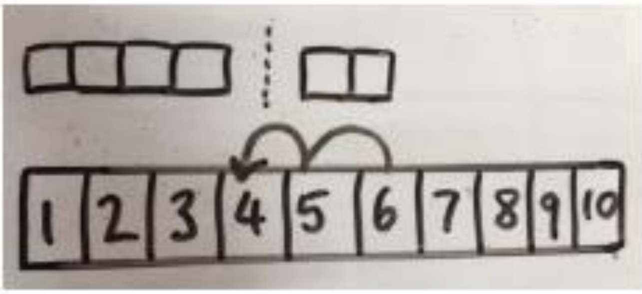
6 – 2 = 4



Using cubes on a number line helps children to create links between the 2 ideas. You might start by just using the cubes first and introduce the number line a little later.

Pictorial:

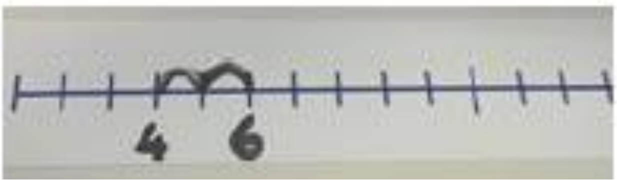
Children to represent what they see pictorially e.g.



Children could use a number line that they have been given rather than having to draw their own. Drawing their own might help children develop number order if they are unsure.

Abstract:

Children to represent the calculation on a number line or number track and show their jumps. Encourage children to use an empty number line



The jump from the concrete and pictorial to the abstract means that children are no longer 'making the whole' first, they are finding the whole on the numberline. Children will need to be secure with the order numbers are in and what they a made up of to be secure with this.

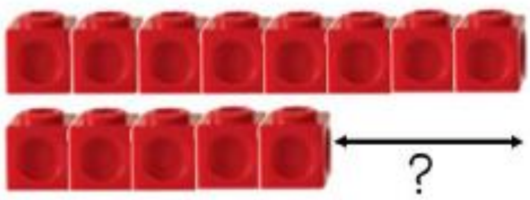
Year 2
Subtracting by finding the difference

https://mathsframe.co.uk/en/resources/resource/68/itp-difference

Concrete:

Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used).

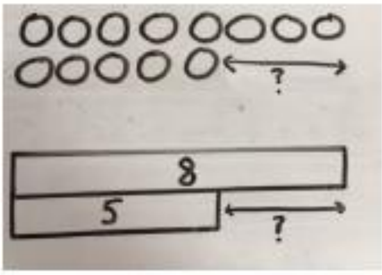
Calculate the difference between 8 and 5.



This is a concept that children sometimes find challenging but it's really important when finding the difference between numbers which are close together. The more confident children about their knowledge of number, the greater their fluency will be.

Pictorial:

Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate.



Abstract:

Find the difference between 8 and 5.

8 – 5, the difference is $\boxed{}$

Children to explore why
9 - 6 = 8 – 5 = 7 – 4 have the same difference.

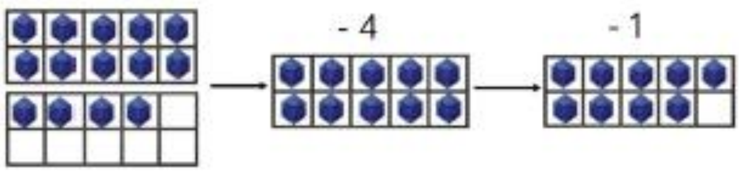
The abstract will come when children increase their fluency and understanding of counting up to find the difference. Ensure children are still encouraged to use pictures until this time. If children are then given 'near' numbers, they begin to make connections between ideas.

If you have concerns about lower ability of SEN children with this method of calculating, please speak to your maths lead.

Subtraction Year 2
Subtracting by finding 10 (applying use of number bondsof numbers up to 10)

Concrete:

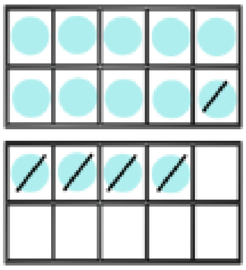
Making 10 using ten frames.
14 – 5



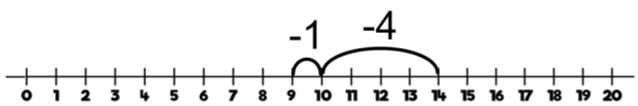
Children will need to use their knowledge of partitioning to be able to do this. This works well when children are going over the 10s boundary.

Pictorial:

Children to present the ten frame pictorially and discuss what they did to make 10.



Moving children onto use the number line is really important because they can see where the nearest 10 is and head there and calculate using their number bond knowledge.



Abstract:

Children to show how they can make 10 by partitioning the subtrahend.

Number which is being subtracted.

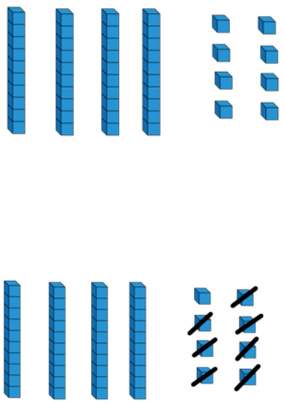
14 - 5 = 9
4 1

Ensure that children partition before they begin to subtract.

14 – 4 = 10
10 – 1 = 9

Subtraction – Year 2/3
Subtracting without exchanging

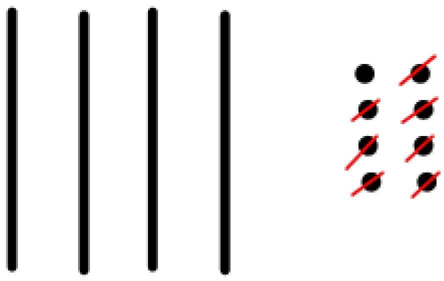
Concrete:



48 – 7 =

Children make the number and take aware the smaller number. This helps children remember that you subtract from the larger number.

Pictorial:

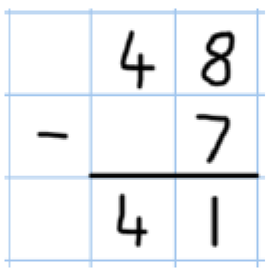


48 – 7 =

Children complete the same process but by drawing a representation of the number using sticks and dots.

Abstract:

Column method or children could count back 7.



48 – 7 =

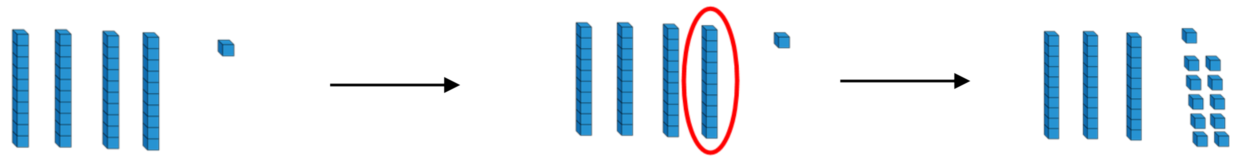
Only when children's knowledge of place value is good enough would you go onto using a more formal written method. Until that time, keep encouraging children to use pictorial representations.

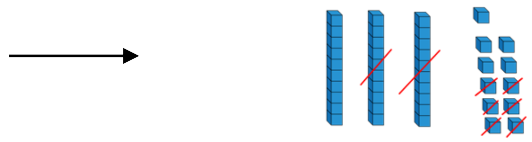
Subtraction – Year 2/3
Subtracting with exchanging

Key learning for teacher and TA's to explain when looking at subtraction is 'Can I do it?' If the question is 56 – 39 = Look at the ones, 6 – 9 then ask 'Can I do it?' Check children's understanding of number before thinking about exchanging and always begin with concrete objects until children are ready to move on.

Concrete:

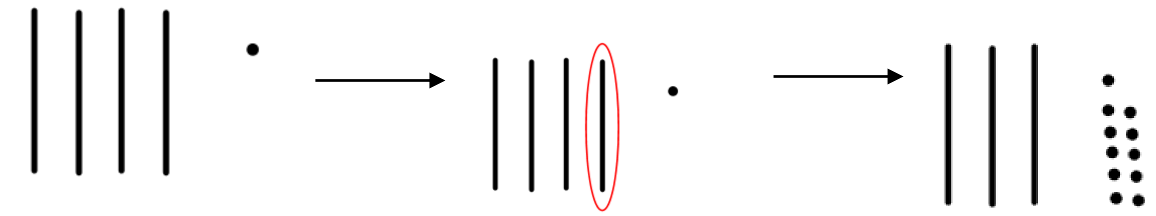
41 – 26 =

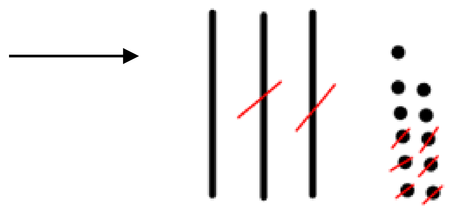




Children need to be able to physically exchange the ten for ten ones to see that they have got the same before they can begin to approach the calculation.

Pictorial:





Children need to be able to draw the exchange to consolidate their understanding of 1 ten and ten ones being the same before the attempt to find a solution.

Abstract:

40 + 1	→	30 + 11	
- 20 + 6		- 20 + 6	

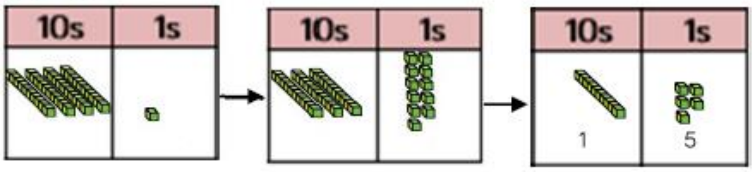
These written calculation will need to be taught alongside the concrete and pictorial representations.

Subtraction - Year 3
Subtracting with exchanging

Key learning for teacher and TA's to explain when looking at subtraction is 'Can I do it?' If the question is 56 – 39 = Look at the ones, 6 – 9 then ask 'Can I do it?' Check children's understanding of number before thinking about exchanging and always begin with concrete objects until children are ready to move on.

Concrete:

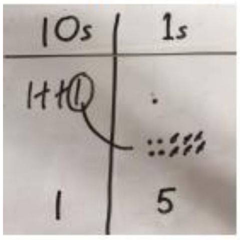
Column method using base 10 and having to exchange.
41 - 26



- 2 6

Pictorial:

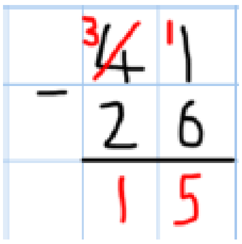
Represent the base 10 pictorially, remembering to show the exchange.



Using the place value grid will help children's understanding of exchange when they are working with larger numbers.

Abstract:

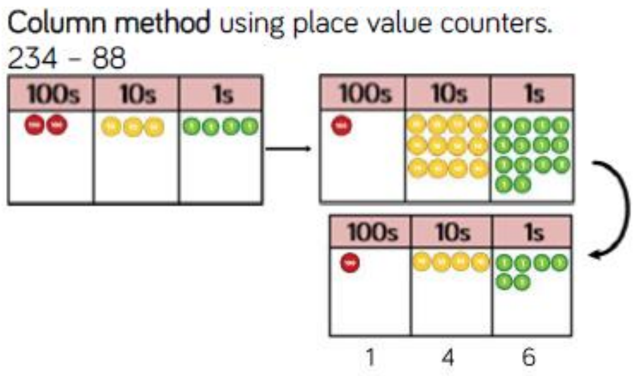
Formal column method. Children must understand that when they have exchanged the 10 they still have 41 because 41 = 30 + 11.



If children are getting confused with a more formal written method, please go back to the more informal way of written subtraction.

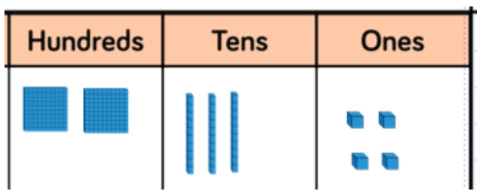
Subtraction - Year 4
Subtracting with exchange – formal method

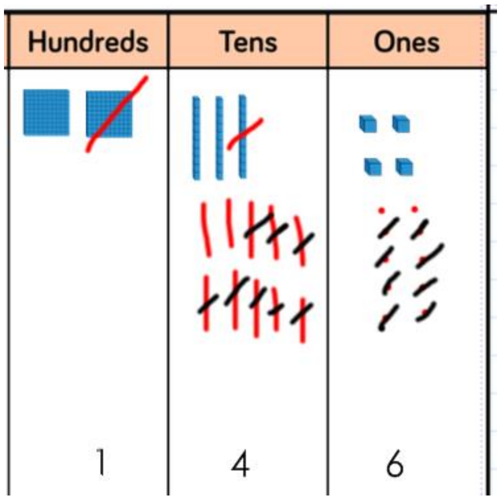
Concrete:



If children's conceptual understanding of larger numbers isn't fully developed, please use base 10 before moving onto place value counters.

Pictorial:
Represent the number pictorially remembering to show what has been exchanged.





Children could draw base 10 representations instead, but encourage children to move on and use the place value grids and counters to help them.

Abstract:

Formal colum method. Children must understand what has happened when they have crossed out digits.

$$\begin{array}{r} 2\,\overset{2}{\cancel{3}}\,\overset{1}{4} \\ -\ \ 88 \\ \hline 6 \\ \hline \end{array}$$

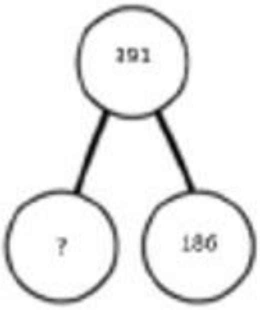
Encourage children to 'talk the maths' when they are using formal methods for the first time. This will help them to consolidate their understanding of exchange and why they need to use it.

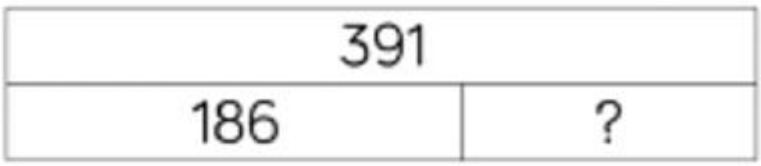
Subtraction – Year 5/6

Formal methods are to be continued with larger numbers and number that include decimals. Please use previous methods with children if they need to use them to grasp the size of the numbers they are using.

Ensure children are shown subtraction questions using different concepts. Please see below for examples of how to present 391 – 186

Whole/Part model and related bar model.





Word problems:

Raj spent £391, Timmy spent £186. How much more did Raj spend?

Calculate the difference between 391 and 186.

Procedural Variation:

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 391
-186
____
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$\boxed{}$ = 391 - 186

What is 186 less than 391?

391 - $\boxed{}$ = 186

Missing digit calcuations:

Missing digit calculations