

PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

MENTAL CALCULATIONS (ongoing)

These are a **selection** of mental calculation strategies:

See NNS Framework Section 5, pages 30-41 and Section 6, pages 40-47

Mental recall of addition and subtraction facts

$$10 - 6 = 4$$

$$17 - \square = 11$$

$$20 - 17 = 3$$

$$10 - \square = 2$$

Find a small difference by counting up

$$82 - 79 = 3$$

Counting on or back in repeated steps of 1, 10, 100 (2's, 5's)

$$86 - 52 = 34 \text{ (by counting back in tens and then in ones)}$$

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.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

Nursery

Before subtraction can be introduced, children need to have a secure knowledge of number. In Nursery, children are introduced to the concept of counting, number order and number recognition through practical activities and games as outlined below. Subitising, where children are secure in recognising quantities without counting begins early in Nursery and continues through Reception as part of the Number and Number System planning.

Children are taught all number objectives within the 30-50 month age band from the Development Matters curriculum.

Children are exposed to counting songs and rhymes on a daily basis through adult led/guided and independent activities e.g. 5 speckled frogs, 1, 2,3,4,5, sing a song of numbers, 5 currant buns.

Concept of number and value is taught through the use of the 'Ten Town' Characters and through children being exposed to different representations of number.

e.g. – fingers/tally marks, dice patterns etc

Children are encouraged to and have the opportunity to be heard to count out loud on an individual basis.

Opportunities for children to explore number are paramount. e.g. how can we represent 3 using lolly sticks? What do we notice? What can you see that's the same or different?



Nursery Subtraction –

Adults model the initial subtraction vocabulary at an age appropriate level. They model the language of number and use contrasting vocabulary right from the start.

'This domino has fewer spots, this domino has more spots'

Children learn how to distinguish the difference between sets of objects and when two groups are of the same size before moving onto 1 more and 1 less

Children are encouraged to show an interest in Number problems through daily interactions with adults within the continuous provision.

For example: -

Role play - I wanted 3 apples, but I've got 5, I have too many. What could I do?

Mark making - I've drawn 4 spots, but meant to draw 3, how many should I take away?

Water – Look there were 5 speckled frogs on the log. Two are now in the water. How many are left on the log?

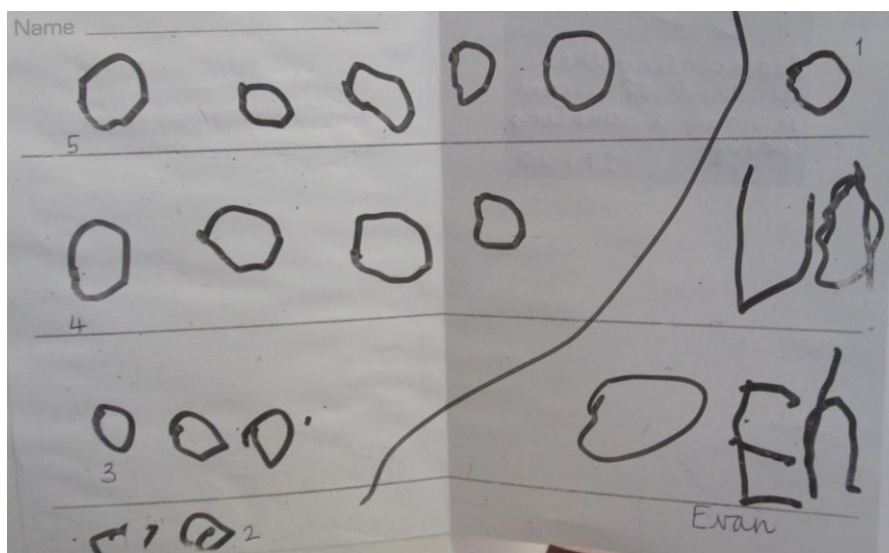
Maths area – Which other dominoes have 4 spots. What's the same? What's different?

Children will engage in a wide variety of songs and rhymes, games and activities.

Children will find one less than a given number.

Children use the language of 1 more and 1 less in practical contexts – role play, playdough cakes and buns and through real experiences at snack time.

They will begin to relate subtraction to having a group of objects that gets smaller.



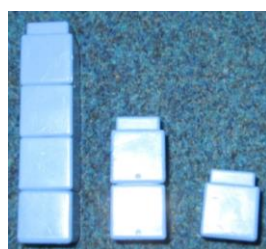
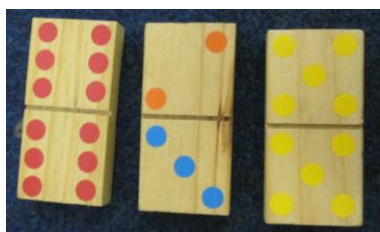
Pictorial representation of '5 currant buns'

YR

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.

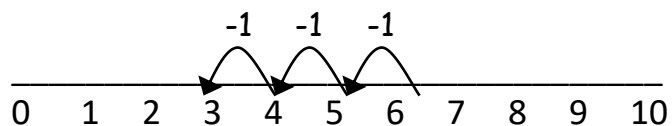


They use numberlines and practical resources to support calculation.



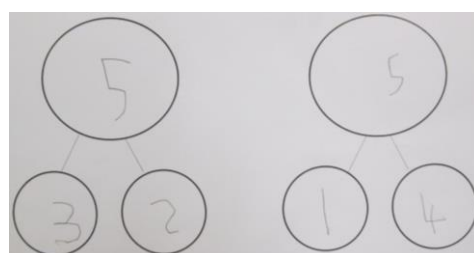
Teachers *demonstrate* the use of the numberline.

$$6 - 3 = 3$$



The numberline should also be used to show that $6 - 3$ means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.

Children may also use the part-part whole model for subtraction.

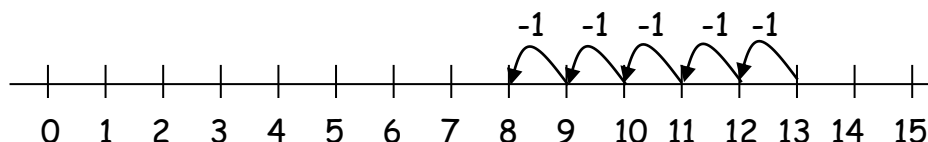


Y1

Children will begin their subtraction learning by using the part part whole model to understand each number in the number sentence. Children will then hear number stories and use objects and pictorial representations to understand subtraction.

Once children are secure they will begin to use a number line to support their own calculations - using a numberline to count back in ones.

$$13 - 5 = 8$$



Children begin to subtract by putting the biggest number in their head and counting back using their fingers.

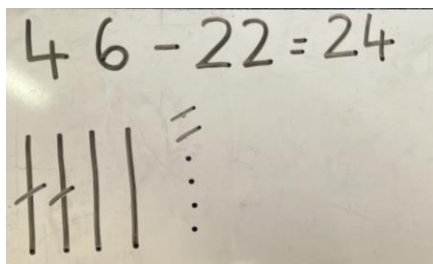
Children use base 10 to help with their understanding of place value. They begin to use this to help subtract 10 from a number.

Counting on / Finding the difference

Children find a small difference by counting on from the smallest number to the biggest.

Y2

Children will begin to subtract multiples of 10 using their knowledge of place value. Children will use base 10 to subtract a multiple of 10 from any number. This will also be used to introduce subtracting two 2 digit numbers. Once children are secure in using base 10 they will move on to drawing their base 10.



Children will then begin to use empty number lines to support calculations.

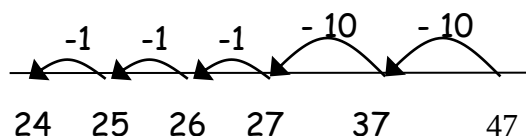
Counting back

- ✓ If we are subtracting a multiple of ten from any number we can count back in tens. We know the tens number will change and the unit of one will stay the same

e.g. $42 - 10 = 32$

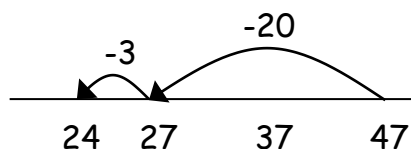
- ✓ First counting back in tens and ones.

$$47 - 23 = 24$$



- ✓ Then helping children to become more efficient by subtracting all the tens first in one jump, and then the units in one jump.

$$47 - 23 = 24$$



Children will continue to use empty number lines to reason and solve subtraction problems.

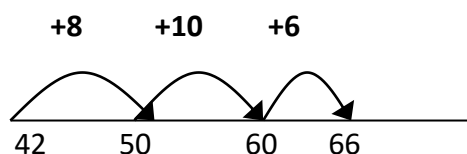
Counting on / Finding the difference

If the numbers involved in the calculation are close together or near to multiples of 10, 100 etc, it can be more efficient to count on.

When the numbers are close together children can count on mentally ie $76 - 72 = 4$

When the numbers are further apart children need to use the strategy of bridging by counting on from the smallest number

$$66 - 42 =$$



Children start at the smallest number then bridge to the next 10. They then count on in tens until they reach the biggest number in their calculation.

Children need to look carefully at the numbers in their calculation to help them to decide whether the best strategy would be to count on or count back.

Children are always encouraged to look for number bonds/number facts to help them solve any subtraction calculation quickly and efficiently.

Y3

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

Partitioning and decomposition

This process should be demonstrated using arrow cards to show the partitioning and base 10 materials to show the decomposition of the number.

NOTE When solving the calculation $89 - 57$, children should know that 57 **does NOT EXIST AS AN AMOUNT** it is what you are subtracting from the other number. Therefore, when using base 10 materials, children would need to count out only the 89.

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

Initially, the children will be taught using examples that do not need the children to exchange.

From this the children will begin to exchange.

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

Step 1 $\begin{array}{r} 70 + 1 \\ - 40 + 6 \\ \hline \end{array}$

Step 2 $\begin{array}{r} 60 + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$

The calculation should be read as e.g. take 6 from 1.

This would be recorded by the children as

$$\begin{array}{r} 60 \\ \cancel{70} + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$$

Children should know that units line up under units, tens under tens, and so on.

Where the numbers are involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

$$102 - 89 = 13$$

