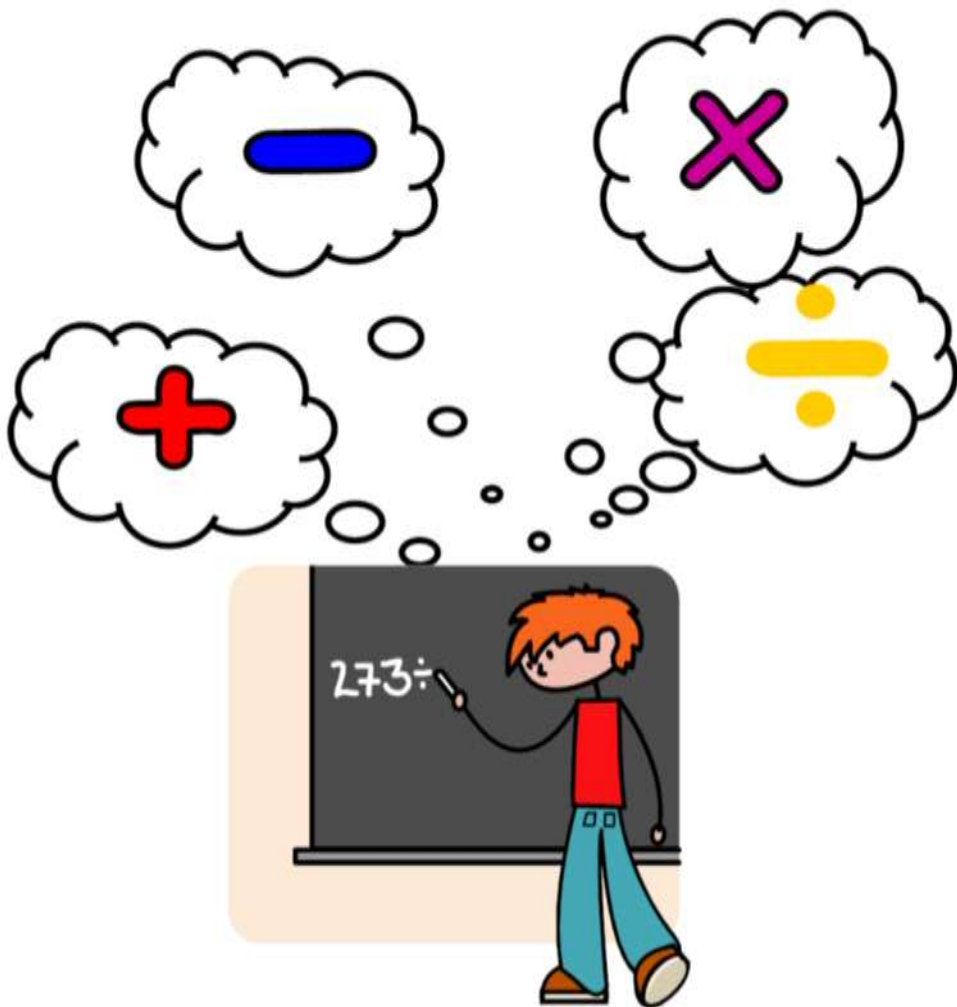


**BENTON DENE PRIMARY SCHOOL  
MATHEMATICS**

**PROGRESSION IN WRITTEN CALCULATIONS**



**CALCULATION : SUBTRACTION  
(WRITTEN METHODS)  
Reviewed: November 2016 - L Gallagher**

# PROGRESSION THROUGH CALCULATIONS FOR SUBTRACTION

## MENTAL CALCULATIONS

(ongoing)

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

### 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, 1000

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

$$460 - 300 = 160 \text{ (by counting back in hundreds)}$$

### 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.*

## Problem Solving

### Progression in problem solving:

Y1: one step problems involving + and - using concrete objects, pictorial representations and missing number calculations eg  $7 = ? - 9$

Y2 and Y3: extension from Y1 to include measures in context and more complex + and -

Y4: problems to include 2-step, in context, with decision making regarding which operations to use.

Y5 and Y6: extend Y4 to multi-step problems in context.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE. CONTINUE TO USE PRACTICAL MATERIALS ALONGSIDE STANDARD WRITTEN METHODS.  
THESE ARE EXEMPLIFIED IN THE VISUAL CALCULATIONS POLICY.

## YR and Y1

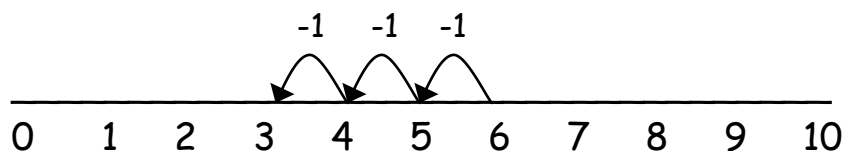
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, rhymes and songs.



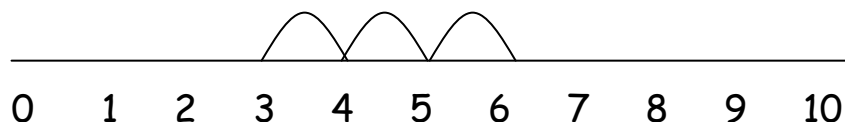
Children read, write and interpret mathematical statements including - and = signs.

They use numberlines and practical resources to support calculation within 20. Teachers *demonstrate* the use of the numberline.

$$6 - 3 = 3$$

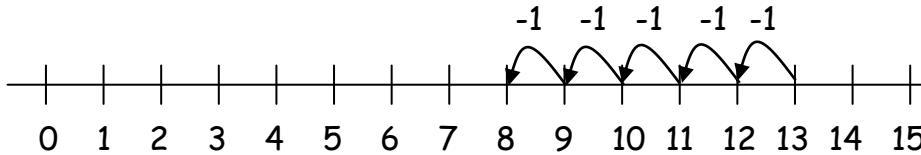


The numberline should also be used to show that  $6 - 3$  means the 'difference between 6 and 3' or 'the difference between 3 and 6' and how many jumps they are apart.



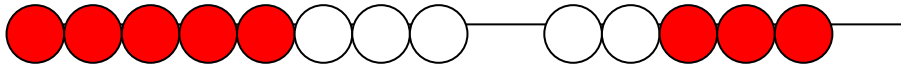
Children then begin to use numbered lines to support their own calculations - using a numbered line to count back in ones, to add and subtract one and two digit numbers to 20 including zero.

$$13 - 5 = 8$$



Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

$$13 - 5 = 8$$



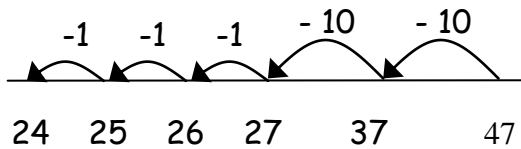
## Y2

Children recall and use subtraction facts to 20, deriving related facts to 100. Children will begin to use empty number lines to support calculations.

### Counting back

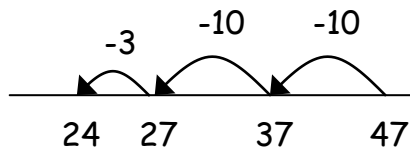
- ✓ First counting **back** in tens and ones.

$$47 - 23 = 24$$



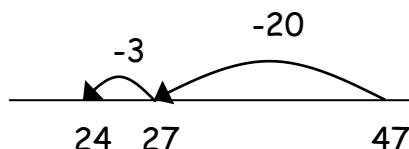
- ✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact  $7 - 3 = 4$ ).

$$47 - 23 = 24$$



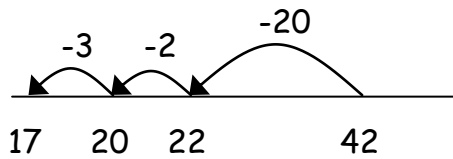
- ✓ Subtracting the tens in one jump and the units in one jump.

$$47 - 23 = 24$$



✓ Bridging through ten can help children become more efficient.

$$42 - 25 = 17$$



Y2 introduces the non-commutative law of subtraction.

### Y3

Children will continue to use empty number lines with increasingly large numbers.

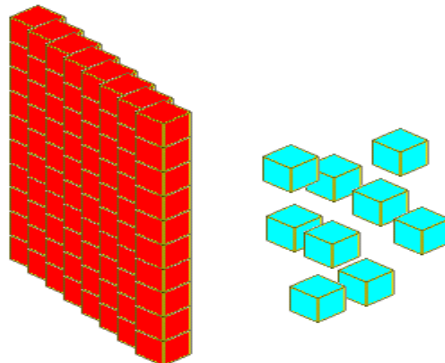
Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

### **Partitioning and decomposition**

This process should be demonstrated using base 10 (Diene's) materials to show the decomposition of the number.

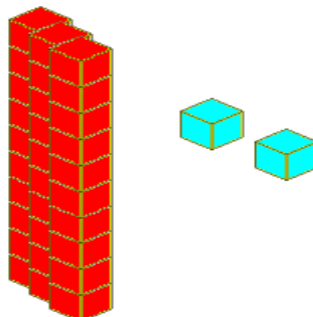
$$\begin{array}{r} 89 \\ - 57 \\ \hline \end{array}$$

**Before:**



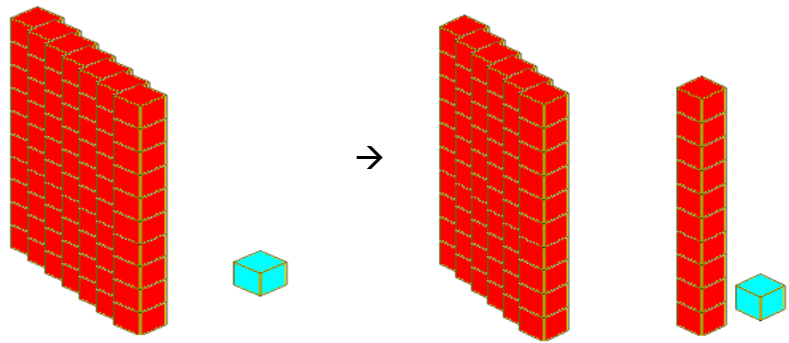
**Subtract 57 ( 5 × 10 and 7 × 1)**

**After:**

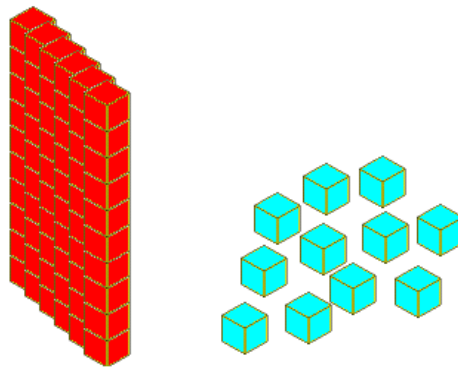


From this the children will begin to exchange.

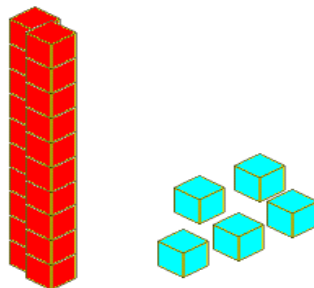
$$\begin{array}{r} 71 \\ - 46 \\ \hline \end{array}$$



Then



Subtract 46



This should be formally recorded.

$$\begin{array}{r} \overset{6}{7} \overset{1}{1} \\ \cancel{7} 1 \\ - 46 \\ \hline 25 \end{array}$$

In Y3 pupils will use columnar subtraction written methods for numbers with 3 digits.

## Y4, Y5 and Y6

Pupils should consolidate place value and written subtraction methods from Y3 extending to larger numbers, with numbers with more than 4 digits.

$$\begin{array}{r} 6141 \\ 7\cancel{0}4 \\ - 86 \\ \hline 668 \end{array}$$

*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,*
- ✓ *know that decimal points should line up under each other.*

*For example:*

$$\begin{array}{r} \text{£}8.95 \\ -\text{£}4.38 \\ \hline \end{array}$$

*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.*

+ - + - + - + - + - + - +

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 their place value is not secure.

Practical materials should be used with all ages and abilities **ALONGSIDE** written methods (VAK learning).

Children should be encouraged to approximate their answers before calculating. Children should be encouraged to check their answers after calculation using an appropriate strategy.

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