

Rationale

At Honley we believe a clear progression in teaching written calculation methods will support the teaching and learning of maths throughout the school. This policy outlines the key pencil and paper procedures that will be taught from Foundation Stage until Year 2.

Although the emphasis here is on written methods, we recognise that the ability to calculate mentally lies at the heart of numeracy. Mental calculation is complementary to written recording and in every written method there is an element of mental processing.

The long term aim is for children to be able to select an efficient method of their choice that is appropriate for a given task. Children will only be able to do this if they have a very secure understanding of each method taught. We therefore, recognise the importance of giving children time to practise and reflect on these written methods so that new concepts can become fully embedded and children can feel confident to apply them in new situations.

As well as the methods described in this policy progression should include:

- An ability to understand and use the relationships between the four operations of number.
- An ability to explain, describe and record their methods.
- An ability to estimate and check whether the answer is correct.
- An ability to solve a wide range of problems involving calculation in wide variety of contexts.

Progression in Written Methods for Addition

Pre-requisite Skill:

To be able to count reliably, including one to one correspondence:

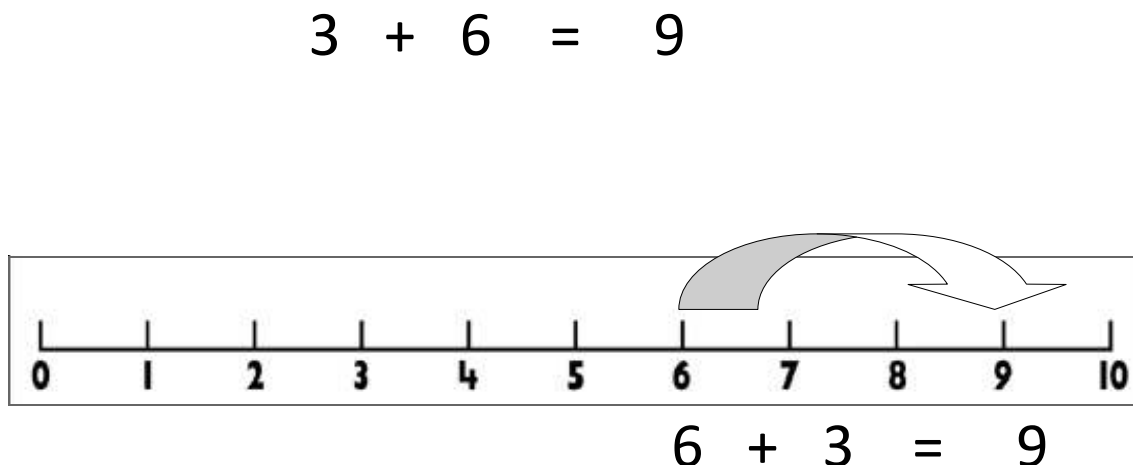
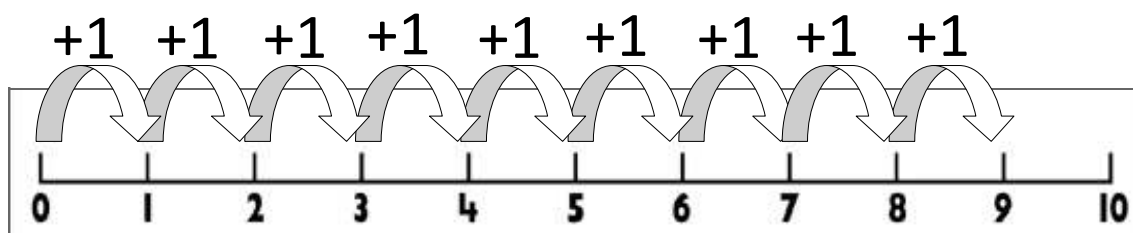
Before written calculations are introduced children will be given the opportunity to sing nursery rhymes and listen to stories that enable them to practise counting. They will practise counting and adding groups of objects practically.

Written Calculation

1. Children will first be expected to add two numbers to 10 using apparatus such as Numicon as an aid. Children will explore how numbers can be added in any order.



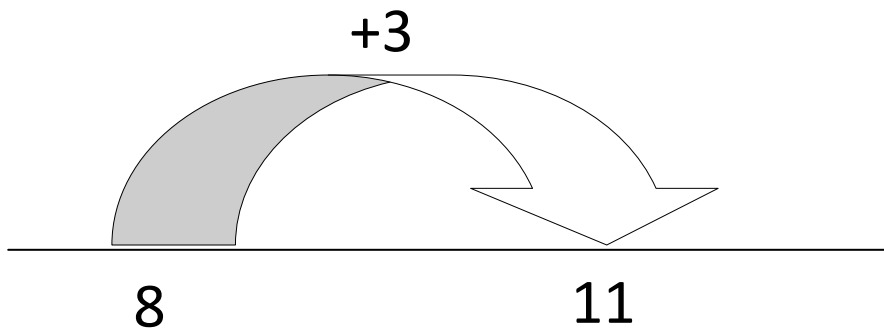
2. The next stage is to add two numbers to ten using a number line. This will first involve jumping in ones before more efficient jumps can be made. For example, starting with the largest number or bridging to 10.



A more efficient jump in which the longest number is added first.

3. When children are confident enough to use the number line they can progress to using a blank number line in which not all the numbers are present.

$$8 + 3 = 11$$



4. The next stage is to add numbers by partitioning. Children must add the tens and then the units to form partial sums, and then these partial sums are added.

$$43 + 25$$

$$40 + 3 + 20 + 5$$

$$40 + 20 = 60$$

$$3 + 5 = 8$$

$$60 + 8 = 68$$

Partitioned numbers are then written underneath one another:

$$\begin{array}{r} 43 = 40 + 3 \\ +25 \quad 20 + 5 \\ \hline 60 + 8 = 68 \end{array}$$

5. This moves onto an expanded method in which the numbers are written in columns:

$$\begin{array}{r} 43 \\ +25 \\ ---- \\ 60 \\ 8 \\ ---- \\ 68 \end{array}$$

At Honley we begin by adding the tens first, as this is a natural progression from partitioning. Children must then move onto adding the units first in preparation for using the compact method.

6. The compact method is quick, efficient and requires the children to do much less recording. However, children must be able to demonstrate that they have a secure understanding of place value before embarking on the use of this method.

$$\begin{array}{r} 47 \\ +26 \\ \hline 73 \\ \hline 1 \end{array}$$

Carry numbers are written beneath the line, using the words 'carry ten' or 'carry one hundred,' not 'carry one.'

Progression in Written Methods for Subtraction

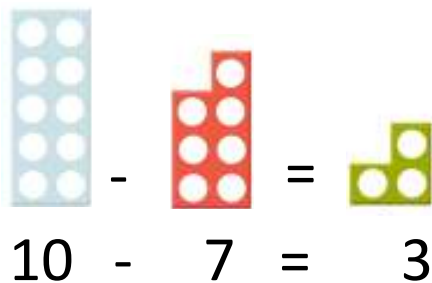
Pre – requisite skills:

To be able to count forwards or backwards to 10.

Children will be given lots of opportunities to sing nursery rhymes and take part in practical situations in order to reinforce their understanding of the vocabulary – subtract, take away, less than, fewer than.

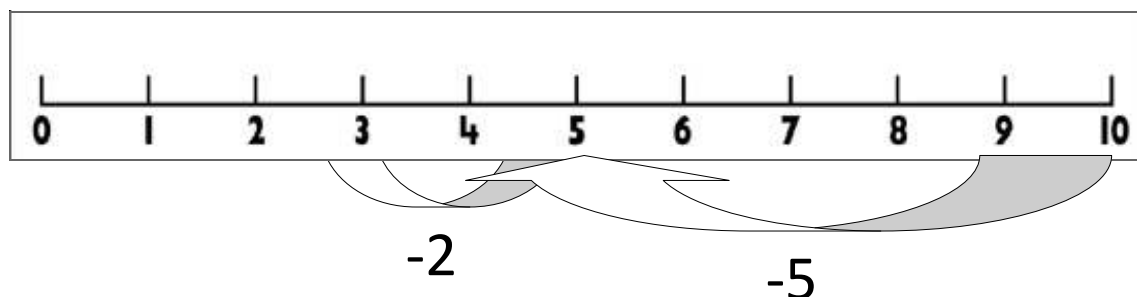
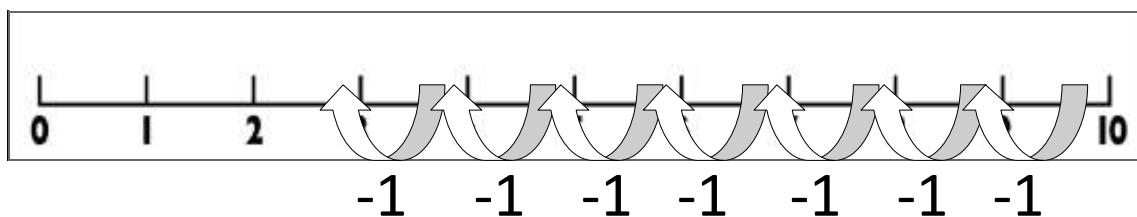
Written Calculation:

1. Children will record simple calculations such as $10 - 3 = 7$, which they will work out using apparatus.

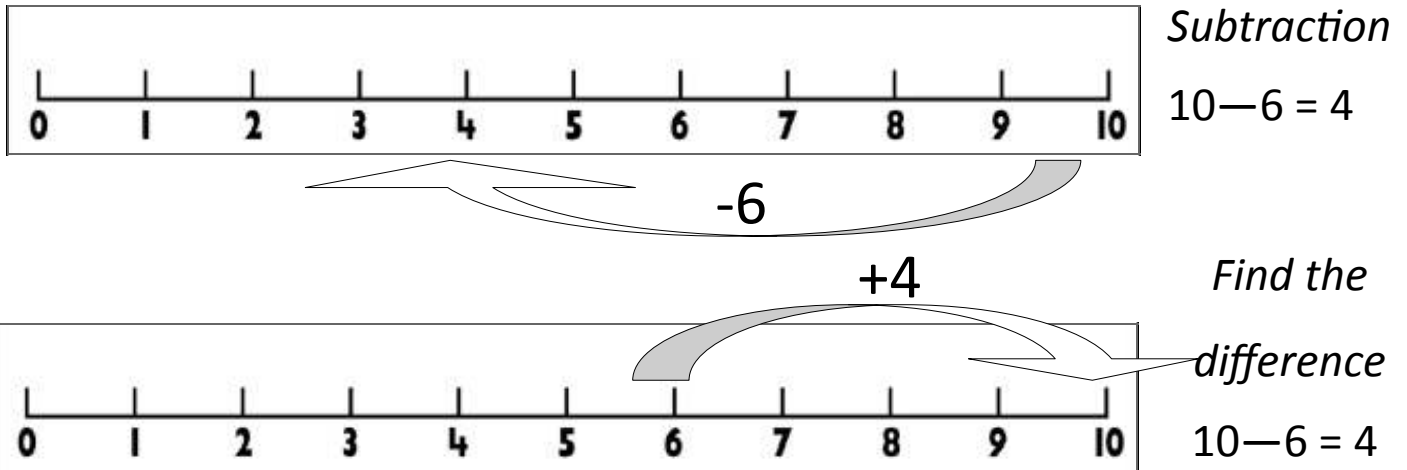

$$10 - 7 = 3$$

2. The next stage is to count backwards along a number line. At this stage children still understand the concept as 'taking away' or 'subtracting.' Children will start by jumping back in ones and will move onto jumping back in a more efficient way, as illustrated.

$$10 - 7 = 3$$

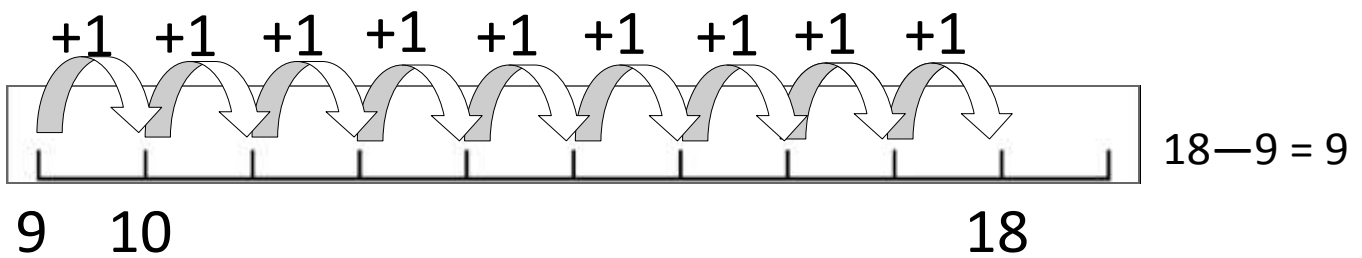


3. As children progress they need to understand the link between taking away and finding the difference. This can be explored by counting forwards or backwards along a number line.

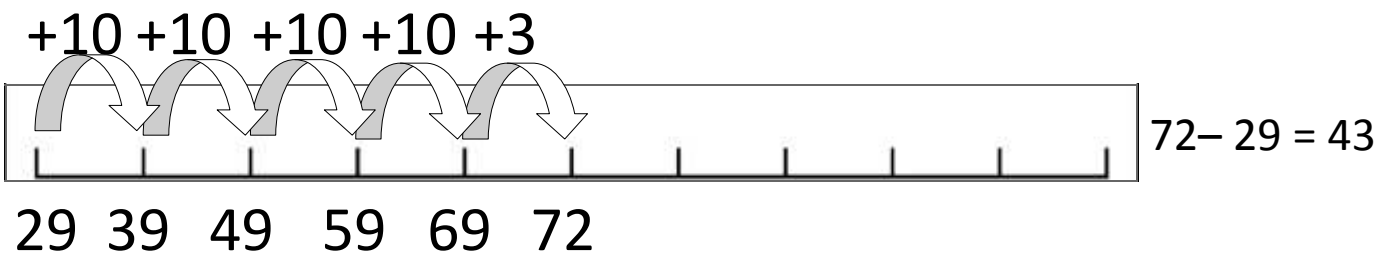


4. When children are confident in using a labelled number line they will move onto using an empty number line. As they begin to use larger numbers they will find the difference rather than count backwards:

The first step is to count up in ones:



As children use larger numbers they count up in tens and ones:



They then learn how to round up to a multiple of ten, as this can reduce the number of steps needed, and is easier for the children to record:



These methods are difficult for the children to understand and require continued practise. For this reason children do not learn compact methods of subtraction until Key Stage 2.

Progression in Written Methods for Multiplication:

Pre – requisite skills:

To be confident in adding numbers.

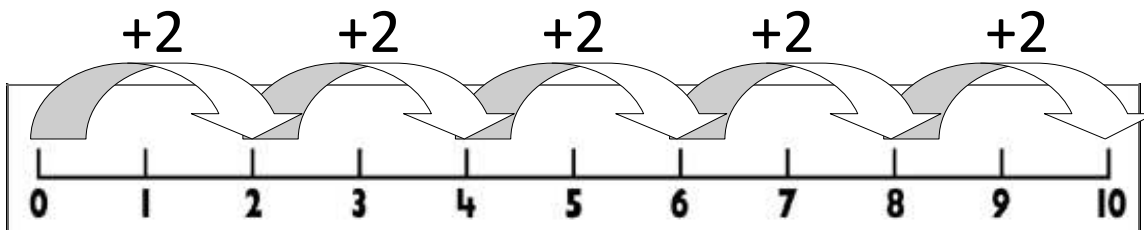
Before embarking on written multiplication, children will be given lots of opportunities for grouping objects and pattern work, both practical and oral.

Written Calculation:

1. Children will first record their work as repeated addition. This can be undertaken first with practical objects and then on a number line:



$$2 + 2 + 2 + 2 + 2 = 10$$

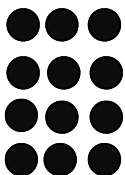


2. When children understand the concept of repeated addition, times notation (X) will be introduced and the link made between the two:

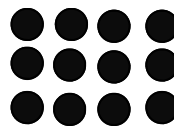
$$\begin{array}{cccccc} ** & & ** & & ** & & ** & & ** \\ 2 & + & 2 & + & 2 & + & 2 & + & 2 & \text{ or } & 5 \times 2 = 10 \end{array}$$

3. Children then record multiplication using arrays:

This is not only highly visual but also enables children to understand the commutative aspect of multiplication:



$$4 \times 3 = 12$$



$$3 \times 4 = 12$$

Children will also be taught the link between multiplication and division and will be encouraged to check answers using one or the other:

Progression in Written Skills for Division

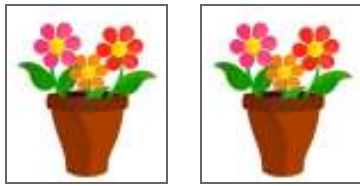
Pre- requisite skills:

Children need to have early experiences of grouping or sharing in practical situations before they can embark on written division. At Honley children will be given lots of opportunities to share objects and learn the associated vocabulary. For example, 'fair share,' divide,' how many left over.'

Written Calculation:

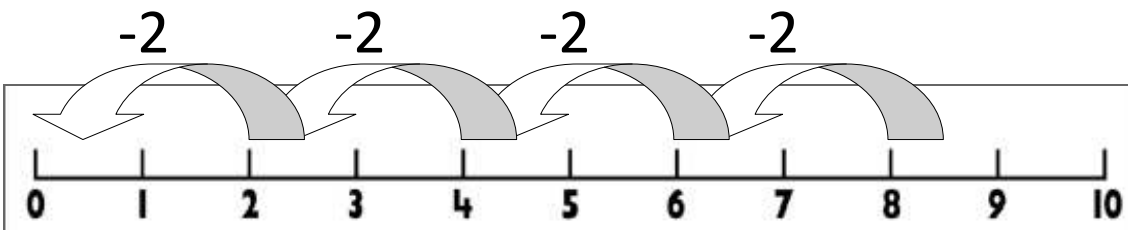
1. Children will calculate the answers to simple division sums by sharing numbers into equal amounts. This method gives children a better understanding of fractions:

$$6 \div 2 = 3$$



2. The next step is to calculate answers by grouping. This method can be undertaken with practical objects or on a number line. This method gives children a better understanding of multiplication:

$$8 \div 2 = 4 \quad ** \quad ** \quad ** \quad **$$



3. Children then move onto sharing numbers into amounts with remainders:

$$11 \div 2 = 5 \text{ r } 1$$

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This policy will be reviewed in the Autumn term of 2013 in consultation with both the Head Teacher and other teaching staff. This will also be in accordance with up to date Local Authority and Government guidelines.

