Calculation Scheme of Work

This calculation policy has been written in line with the programmes of study taken from the revised National Curriculum for Mathematics (2014). It provides guidance on appropriate calculation methods and progression. The content is set out in yearly blocks under the following headings: addition, subtraction, multiplication and division.

Objectives

We believe that all children should be able to calculate efficiently, appropriately, reliably and with confidence in all four operations. Our children should have confidence in mental methods of calculation, built on a secure understanding of place value and known number facts. They should understand the progression they need in order to efficiently record the steps taken and explain their choice of methods. We recognise the need to move from concrete experiences in mathematics to abstract through the use of models and images in order to develop children's visualising skills and support mathematical learning. This scheme of work reflects the classroom approach of: concrete (do it) abstract (see it!) visual (remember it!) communication (record it!)

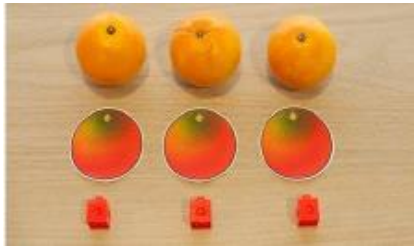
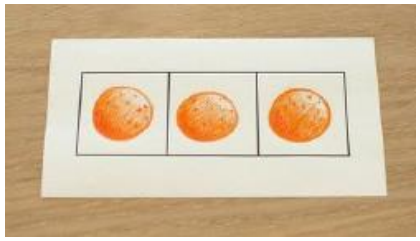
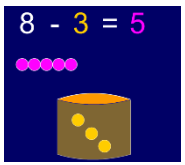
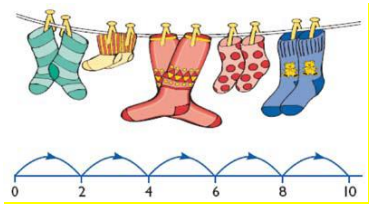
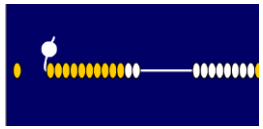
Aims

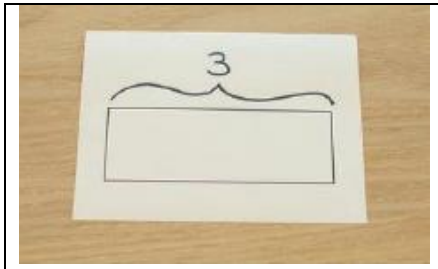
- To ensure consistency and progression in our approach to calculation
- To ensure that children develop an efficient, reliable, formal written method of calculation for all operations
- To ensure that children can use these methods accurately with confidence and understanding

Teachers are EXPECTED to ensure that they have a thorough understanding of the progression within this scheme of work.

Revised December 2016

RECEPTION

Addition	Subtraction	Multiplication	Division
Counting objects, partitioning and recombining sets using practical apparatus and pictures.    **Drawing boxes to represent parts of a whole**  **Then introducing the numeral**	**Know that the number gets smaller because objects have been removed from the set (acting out/singing subtraction songs)** **Practical models of subtraction – opportunities for children to physically takeaway using apparatus.** **Counting back on fingers, orally, number lines.** **Find the difference, counting on. Models and Images charts.** **MODELS AND IMAGES CHARTS** **Practical demonstrations of take away using apparatus moving to images (concrete to abstract).** *There were 9 balloons. Two popped. How many are left?*  9 – 2 = 7 *There were 8 cakes on a plate. Mary ate 3 of them. How many were left? 8 - 3 = 5*  http://www.taw.org.uk/lic/itp/num_facts.html	**Jumping along number lines/ tracks in jumps of 1, 2, 5 & 10.**  **Repeated addition, practical demonstrations.** **MODELS AND IMAGES CHARTS** **Use the number beads and 100 square to count on in 2s, 5s and 10s**  **What number comes next?** **Describe the pattern. Will 45 be in the pattern? Why?** **How do you know?** **What number will not be in the pattern?** **How do you know?**	**Counting on and back in steps of 1, 2, 5 and 10.** **Sharing equally and halving objects in practical contexts.** **Pictorial recording.** **Grouping, in practical contexts.** **GROUPING ITP** **Use cross curricular links (PE) and purposeful objects such as sock and shoes/ animals in the ark to get into groups.** **Sharing models such sharing an apple or a Satsuma.**  *How many cars can you make if you have 8 wheels?*



Understand that the number gets bigger.

Addition is commutative (can be done in any order).

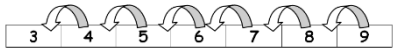
Understand that it is more efficient to count on from the number of objects in the first set rather than starting counting from zero.

"There are 5 coins in the tin. Listen as I put in some more. How many coins are there now?"

5 in the bag and 3 more

Using a number track to count back .
There were 9 birds on the fence. 6 birds flew away. How many birds were left?

9 – 6 = 3



Find the difference where numbers are close together.

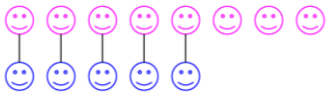
8 + ? = 10

7 + ? = 10

7 + 3 = 10

15 + 5 = 20

There are 8 girls and 5 boys. How many more girls are there than boys?



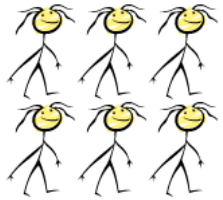
Count 2p coins, for example by tapping the coin twice on the table to remember that it is worth 2p.

Ask questions such as: how many groups of 2ps make 12p? What is the value of 4 groups of 2ps?

10p+10p+10p+10p=40p

Arrays

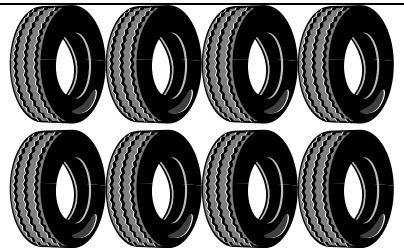
Arrays are a rectangular arrangement to show the equal groups.



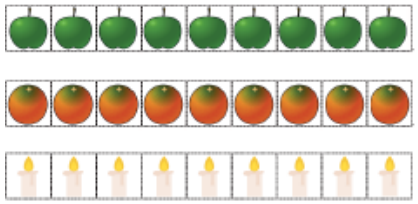
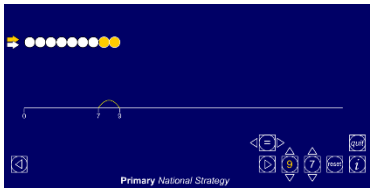
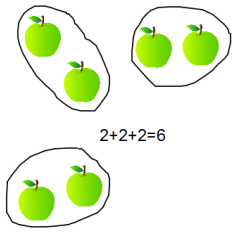
This is an array

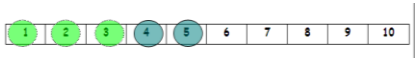
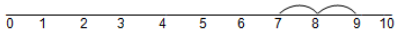
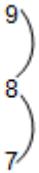
2 lots of 3 or 3 lots of 2.

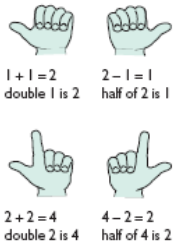
Use of arrays to show that multiplication is commutative. Changing



How many pairs of socks can we make from this pile of socks? Count the pairs.

5 +  Begin using practical apparatus before moving onto pictorial recording of practical experiences.  COUNTING ITP See progression in number sense document *Jane had 3 bears. She was given 2 more. How many does she have now?*   = 5 **Use number tracks and number lines to develop skills of counting on.**	Expect clear discussion in the form of: "There are 3 more girls than boys." "There are 3 less boys than girls." "How many more do I add to 5 to get to 8?" "The difference between the girls and boys is 3." The teacher is to demonstrate and model the use of signs and symbols within a written calculation. 8 – 5 = 3  http://www.taw.org.uk/lic/itp/itps/difference_1_2.swf 9 – 7 = 2 Provide many opportunities for use of the following vocabulary: "less" and "difference" *"How many more do I add to 7 to get to 9?"* Fully numbered number lines 9 – 7 = 2	**the order does not affect the answer. Peg boards are a useful model.** **Use the language of 'lots of', 'groups of' and 'sets of' for 'x'.** **Doubles and grouping** **Grouping** **Grouping is a random arrangement of a quantity into equal groups.**  GROUPING ITP **Understand the difference between group sizes e.g. 2 groups of 3 is visually different to 3 groups of 2 even though they have the same total.**	

Ask children to count the number of jumps they need to make to get from one number to another on a number track or line   3 + 2 = 5 Give children practical experience of adding through counting on, including where one set of objects is screened and using a number track or line. Get children physically to jump forwards and backwards along number tracks and lines Regularly rehearse with the children the skills that will help them to use and understand addition strategies more readily.	 **Vertical number line to show the difference. Number ladders.** 9 – 7 = 2  		

These include: -- counting forwards from any start number -- showing and recognising fingers that represent numbers 1 to 10; -- raising a finger for every number to keep track of a count. **Teacher modelling of number sentences and addition as commutative.**  Provide children with partially completed number tracks, to give them experience of identifying which number goes before or after given numbers. 1 | | ? | | 5 | ? | 7 | | ? | 10			

 10 = 5 + 5  10 = 7 + 3  10 = 3 + 7 We have 10 pegs on the coathangers, how can we split them into 2 groups? Is there another way? How can you be sure you have got them all? **Once numbers can be written, number sentences can be recorded.** **To have experience of '=' sign as last stage in calculation.** **ADDITION AND SUBTRACTION EXCEL**			