Infant Maths

@ HPS

We follow the national curriculum (NC).
Key aims of the NC are:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop **conceptual understanding** and the **ability to recall and apply knowledge rapidly and accurately**
- **reason mathematically** by following a line of enquiry, **conjecturing relationships** and generalisations, and d**eveloping an argument, justification or proof using mathematical language**
- can **solve problems** by a**pplying their mathematics to a variety of routine and non-routine problems with increasing sophistication**, including breaking down problems into a series of **simpler steps and persevering** in seeking solutions

Reception - Early Learning Goal
These are the expectations for the end of the Reception

Number

- Recognise some numerals of personal significance.
- Recognises numerals 1 to 5.
- Counts up to three or four objects by saying one number name for each item.
- Counts actions or objects which cannot be moved.
- Counts objects to 10, and beginning to count beyond 10.
- Counts out up to six objects from a larger group.
- Selects the correct numeral to represent 1 to 5, then 1 to 10 objects.
- Counts an irregular arrangement of up to ten objects.
- Estimates how many objects they can see and checks by counting them.
- Uses the language of 'more' and 'fewer' to compare two sets of objects.
- Finds the total number of items in two groups by counting all of them.
- Says the number that is one more than a given number.
- Finds one more or one less from a group of up to five objects, then ten objects.
- In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting.
- Records, using marks that they can interpret and explain.
- Begins to identify own mathematical problems based on own interests and fascinations.

Shape and Space

- Beginning to use mathematical names for 'solid' 3D shapes and 'flat' 2D shapes, and mathematical terms to describe shapes.
- Selects a particular named shape.
- Can describe their relative position such as 'behind' or 'next to'.
- Orders two or three items by length or height.
- Orders two items by weight or capacity.
- Uses familiar objects and common shapes to create and recreate patterns and build models.
- Uses everyday language related to time.
- Beginning to use everyday language related to money.
- Orders and sequences familiar events.
- Measures short periods of time in simple ways.

End of KS1 (Year 2) expectations for SATs

This is a brief explanation only. These skills will need to be applied across a range of contexts.

- partition two-digit numbers into different combinations of tens and ones. This may include using apparatus (e.g. 23 is the same as 2 tens and 3 ones, which is the same as 1 ten and 13 ones)
- add 2 two-digit numbers within 100 (e.g. 48 + 35) and can demonstrate their method using concrete apparatus or pictorial representations
- use estimation to check that their answers to a calculation are reasonable (e.g. knowing that 48 + 35 will be less than 100)
- subtract mentally a two-digit number from another two-digit number when there is no regrouping required (e.g. 74 – 33)
- recognise the inverse relationships between addition and subtraction and use this to check calculations and work out missing number problems (e.g. Δ – 14 = 28)
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables to solve simple problems, demonstrating an understanding of commutativity as necessary (e.g. knowing they can make 7 groups of 5 from 35 blocks and writing 35 ÷ 5 = 7; sharing 40 cherries between 10 people and writing 40 ÷ 10 = 4; stating the total value of six 5p coins)
- identify 1/3, 1/4, 1/2, 2/4, 3/4 and knows that all parts must be equal parts of the whole.
- use different coins to make the same amount (e.g. use coins to make 50p in different ways; work out how many £2 coins are needed to exchange for a £20 note)
- read scales in divisions of ones, twos, fives and tens in a practical situation where all numbers on the scale are given (e.g. pupil reads the temperature on a thermometer or measures capacities using a measuring jug)
- read the time on the clock to the nearest 15 minutes
- describe properties of 2-D and 3-D shapes (e.g. the pupil describes a triangle: it has 3 sides, 3 vertices and 1 line of symmetry; the pupil describes a pyramid: it has 8 edges, 5 faces, 4 of which are triangles and one is a square).

A Mastery Approach

We adopted a mastery approach throughout the school starting last year (2016-17) and continuing this year (2017-18).

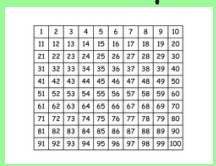
What our approach means:

- developing understanding is key and we usually spend longer on a topic
- using concrete apparatus and pictorial representations before moving on to abstract calculations
- removing a ceiling for children
- developing mathematical language and reasoning
- providing opportunities to go deeper

We are constantly reviewing and modifying how and what we teach.

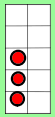
Some of the resources we use

Number squares



Base 10

10 frames

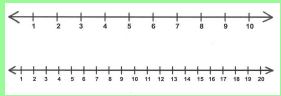


Counters

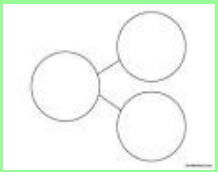
Everyday objects

Interlocking cubes

Number lines



Part-part-whole diagrams



Place value counters

Rulers

Bead strings

Numicon

Addition

2 + 3 = 5
Know number facts by heart.

52 + 10
Count on in 10's from any number

35 + 9
Add 10 and subtract 1

How would you solve these?

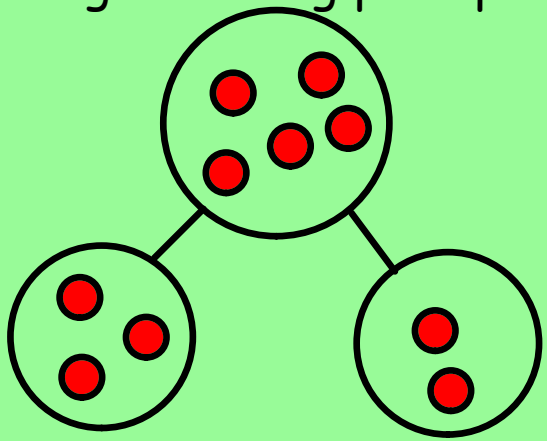
65 + 30
Count on in 10's from any number

54 + 28
1.) Partition into tens and ones 50 + 20 8 + 4 and then recombine.
2.) Add on 20 to 54, then add on 8

4 + 6
Know number bonds to 10

Addition

Reception - practical, counting on and combining groups of objects. Introducing and using part-part-whole models



Children may begin to write number sentences

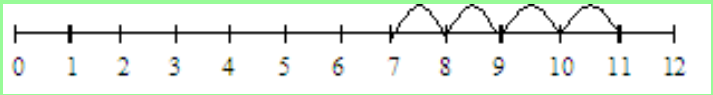
e.g. 3 + 2 = 5

Addition

Year 1 - practical, counting on using a number line or number square and combining groups of objects, continue to use part-part-whole.

7 + 4

Children learn how to count on. They develop understanding of commutativity in addition (adding can be done in any order) and usually put the largest number first. They use number lines or fingers to count on, and count jumps i.e. they don't count the initial number. Children are always encouraged to use fingers as apparatus - they are very useful, as are rulers!



Children learn to write number sentences and solve basic missing number problems

e.g. 7 + 4 = 11

11 = 7 + 4

Addition

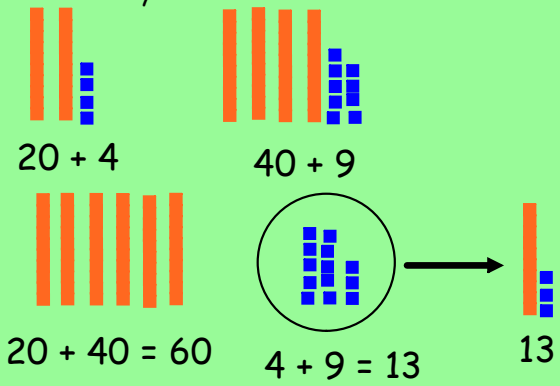
Year 2- greater focus on written mathematics.

Children will be solving addition problems involving larger numbers, including two digit numbers - e.g. 24 + 49

Partition into tens and ones and recombine

24 + 49

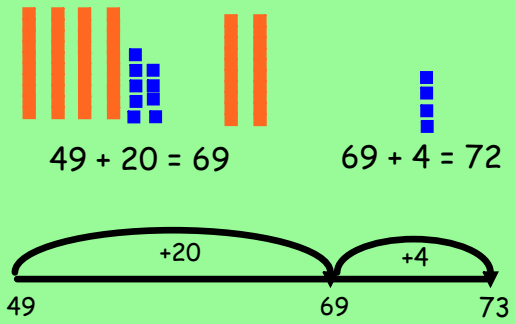
Pictorially:



Abstract:

24 + 49 = 20 + 40 + 4 + 9
= 60 + 13
= 73

refine to partitioning the second number only:



24 + 49 = 49 + 20 + 4
= 69 + 4
= 73

Subtraction

5 - 3 =2
Know simple number facts

52 - 10 = 42
Understand that subtracting 10 doesn't change the units

64 - 28
Use a numberline - (explained later)

How would you solve these?

95 - 30 = 65
Subtract 3 tens

35 - 9
Subtract 10 and give back 1

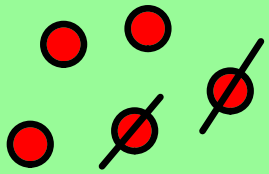
26 - 24
Find the difference by counting on - count on 25, 26 - difference of 2.

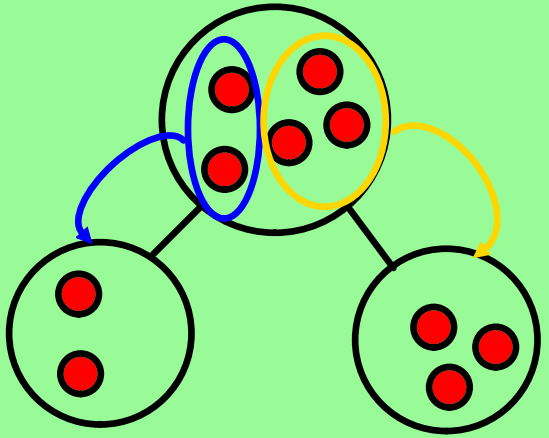
10 - 3
Use number bonds to 10
3+7 = 10

Subtraction

Reception - practical, counting back and taking objects away from a group of objects

For five take away two



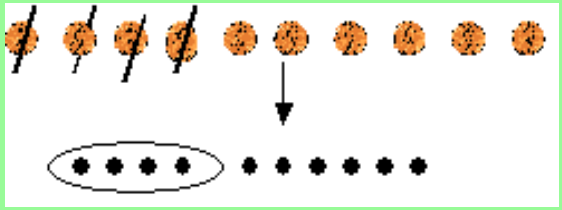


Children may begin to write number sentences

e.g. 5 - 2 =3

Subtraction

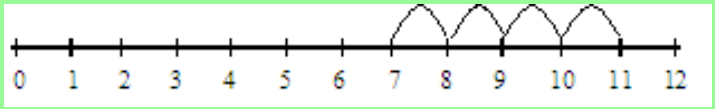
Year 1 - The main focus is once again on practical mathematics.
Pictorial examples will allow children to record working out.



Children use subtraction sign in number sentences.
7 - 3 = 4

Number lines (numbered)

11 - 7 =
The difference between 7 and 11
(Counting up)

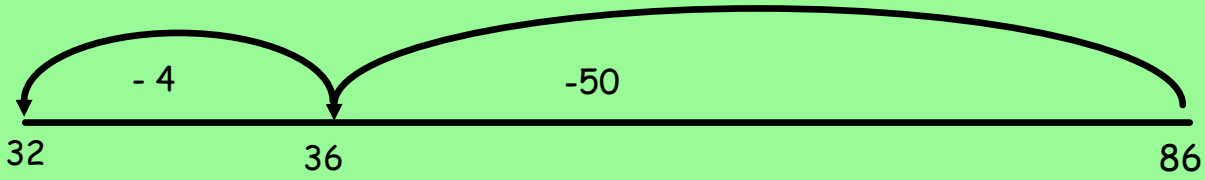


Recording by - drawing jumps on prepared lines
- constructing own lines

(Teachers model jottings appropriate for larger numbers)

Subtraction

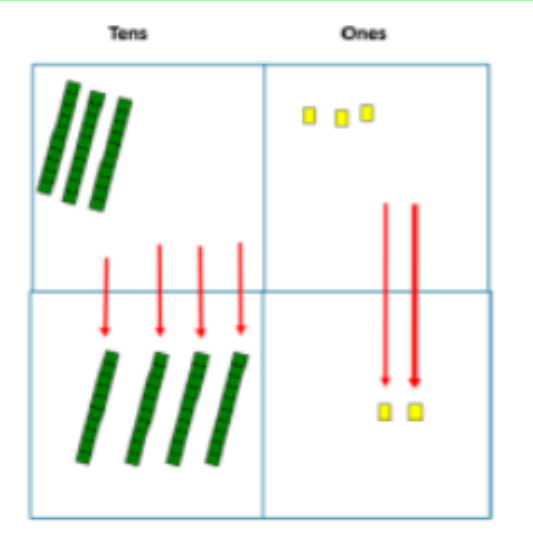
Year 2 - Written method - Children will be taught to subtract using a number line and count back.



86 - 54 = 32

To complement this children will be taught strategies to subtract mentally.
Counting back in 10s
Subtracting 9 by subtracting 10 and adding 1.
Counting back to nearest 10 by partitioning -> e.g. 25 - 9 becomes 25 - 5 - 4
Finding the difference by counting on

Subtraction



Beginning column method without regrouping (stealing and exchanging)

75 - 42 = 33

$$\begin{array}{r} 75 \\ -\ 42 \\ \hline 33 \end{array}$$

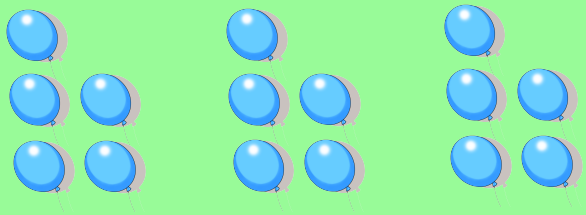
Multiplication

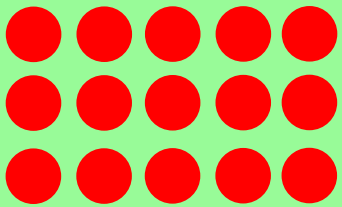
In the infants multiplication is done at a very basic level.

In Reception apparatus is used all the time. Written examples use mostly pictorial representations:

How many are there in total? 3 x 2
Children will begin to **double numbers** and learn these.

In Year 1 apparatus is used frequently too.
Multiplying is portrayed as repeated addition much like in reception and begin to use arrays.





Children are taught to count in regular amounts - 10's, 2's and 5's as sequences.

In Year 2 apparatus is continued to be used.
Multiplying is portrayed as repeated addition but arrays are used too. Children write number sentence 2 x 4 = 8

Arrays

2 x 4 or 4 + 4

4 x 2 or 2+2+2+2

Children need to understand commutativity of multiplication (that it can be done in any order).
Times tables are taught and this needs to be supported at home.
Times tables - 10, 2 and 5's - children should know these (preferably off by heart) by the end of Y2.

Division

Division is complex - there are two types of division.

In Reception apparatus is used to do basic division. This is generally halving.
Shapes are cut into half, objects split into two piles and some basic division by up to 3 or 4 is done purely practically. No reference is made to mathematical symbols at this point. Children will solve problems using equipment to halve numbers and share numbers up to 20.

In Year 1 apparatus is used frequently.
Division is portrayed as sharing.

Division also comes in as part of fractions: finding half and quarter of a quantity.

In Year 2 apparatus is continued to be used.
Division is portrayed as sharing into equal groups. Children rely on drawings and objects to share out.

Children will also begin to identify division as repeated subtraction or grouping. This can be shown on a numberline as:

Grouping - There are 6 sweets. They are put into packs of two. How many packs are there? (How many 2's make 6?)