Robert Le Kyng

Calculation Policy for Parents

Addition and Subtraction

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject. (*National Curriculum, 2014*)

At Robert Le Kyng Primary School every class has a daily maths lesson of 45 minutes to one hour. Teachers often teach the whole class together for a proportion of the time, and oral and mental work feature strongly in each lesson. Many parents find that their children are using methods or strategies which are different from those used in the past. This can often cause confusion when trying to support your child at home. It is important that methods used in school are reinforced at home so as not to cause unnecessary confusion for the child.

The purpose of this booklet is to show the progression from mental to written strategies in the number operations of addition and subtraction, as taught at Robert Le Kyng Primary School. This will enable you to support your child with strategies which you may previously have been unfamiliar with.

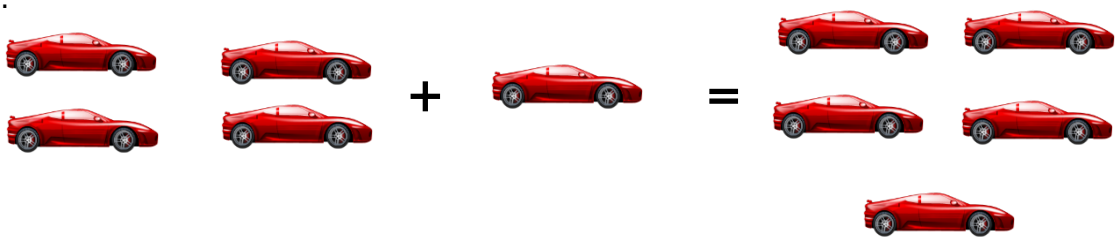
This booklet gives an indication of when each strategy is likely to be used. This will be the case for the majority of children but it is important to be aware that some children will still need to consolidate earlier methods whilst some will be working on more complex strategies. Your child's teacher will be able to tell you which methods your child should be using.

Addition

In the **Early Years**, much of our maths is done in a practical context using toys and equipment to solve mathematical problems.

Once children are confident with counting, they start by finding **"one more"** than any given number. This can then be recorded in a simple number sentence.

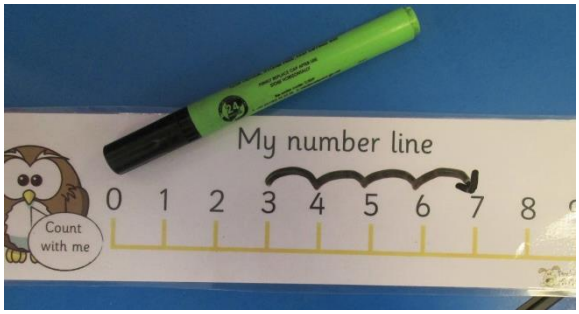
eg.



4 + 1 = 5

Once the children are confident adding one more, the children use the same strategies to add single digit numbers. They move onto using a number track or number line to support their calculation by **"counting on".**

eg. 3 + 4 = 7

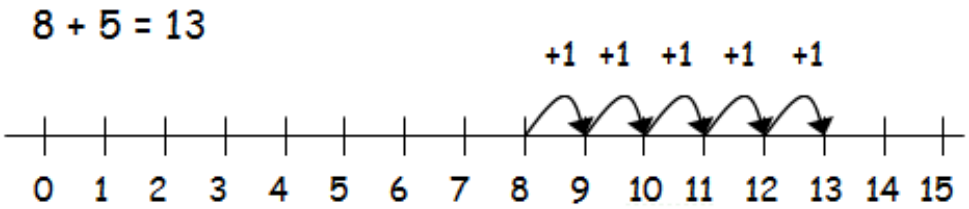


Key Stage 1

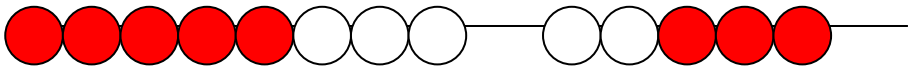
The principal focus of mathematics teaching in **Key Stage 1** is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Year 1

Year 1 continue to use practical resources and number lines to support their calculations. They progress onto using 1-digit and 2-digit numbers up to 20, including zero. They will begin to draw their own number lines.



or, using a bead string…



We do lots of work in Year 1 and 2 to make sure the children are really secure with their number bonds to numbers up to 20.

Eg.	1 + 9 = 10	1 + 13 = 14	1 + 19 = 20
	2 + 8 = 10	2 + 12 = 14	2 + 18 = 20
	3 + 7 = 10	3 + 11 = 14	3 + 17 = 20
	etc.	etc.	etc.

To use their addition facts effectively, the children should also know the subtraction facts to go with them. Eg if 8 + 6 = 14, then 14 - 8 = 6 and 14 - 6 = 8.

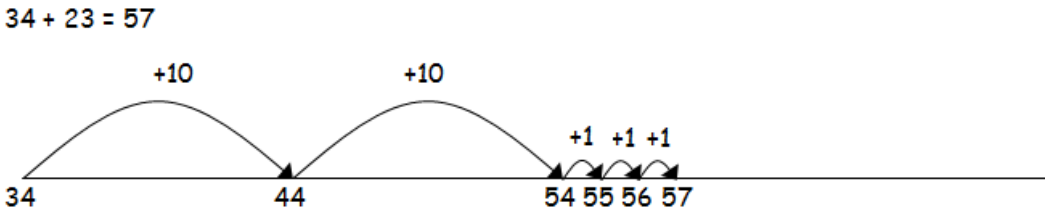
Year 2

The children will continue to rehearse the skills from Year 1 and when they are ready, move onto using more 2-digit numbers, firstly adding a single digit number to a 2-digit number, then adding on a multiple of ten to a 2 digit number and finally adding two 2-digit numbers. They will use number lines and practical equipment to support this.

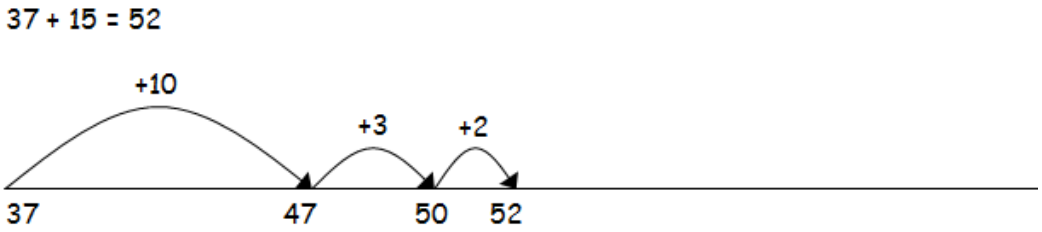
As the numbers get bigger, we encourage the children to use more efficient "jumps". To do this, they need to have a secure understanding of the place value of numbers.

eg.

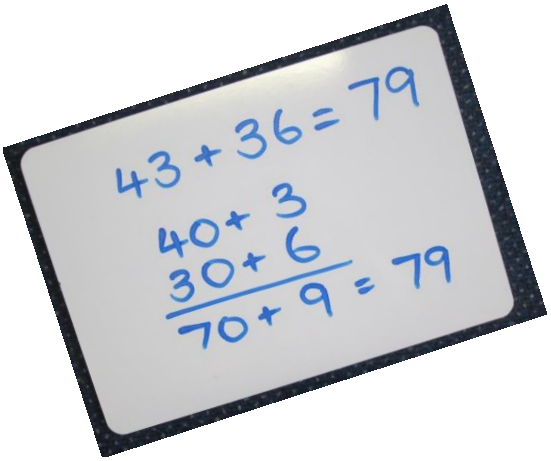
We then start by jumping the right number of tens and then the units.



Once the children are happy with this, we encourage them to become more efficient with adding the units in bigger chunks, using their number bond knowledge to support them. We encourage children to jump to the next "tens" number (eg. 50) and then to jump on the rest.



By the end of Year 2, we start to introduce an "expanded method" using vertical columns to get the children ready for the traditional compact method.

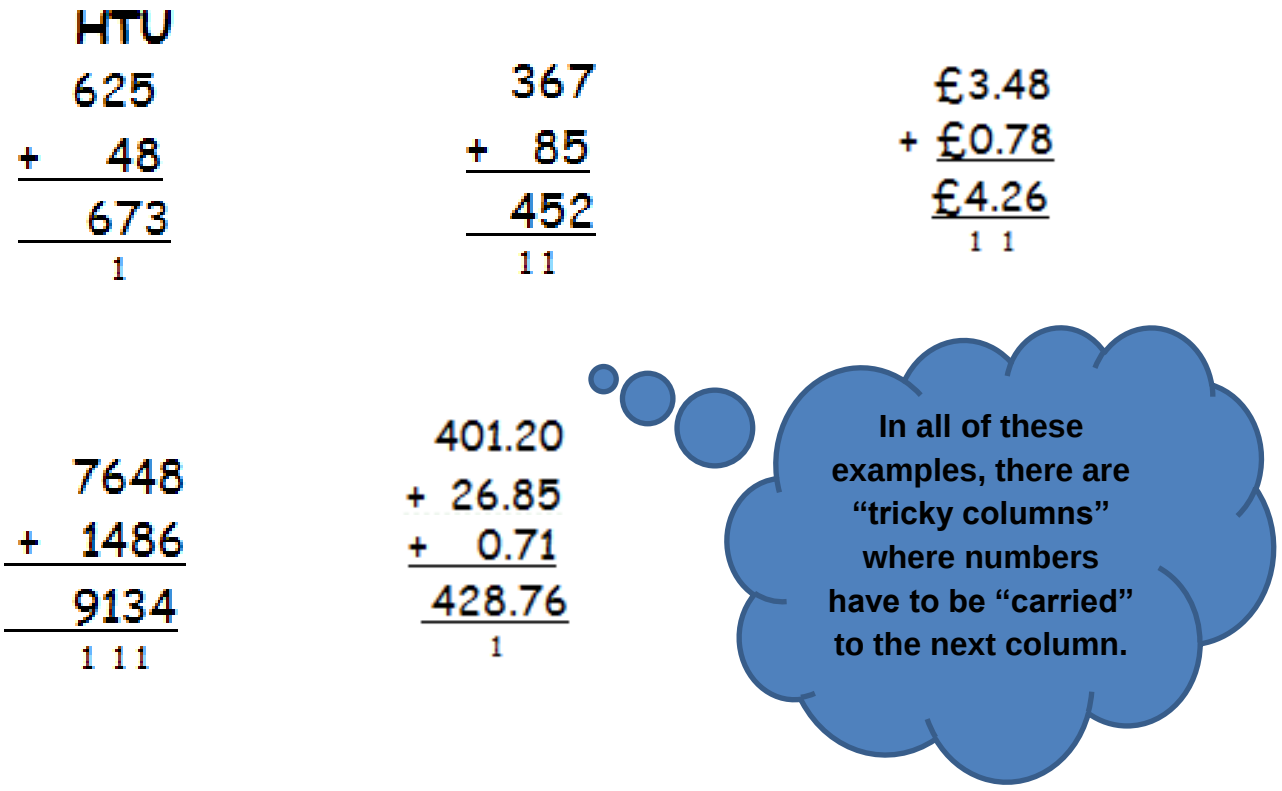


At this point there are no "tricky columns" where the children have to carry the units.

Key Stage 2 (Years 3 to 6)

In Key Stage 2, we still encourage the children to use the number line method in their head to work with smaller numbers efficiently and to be selective about the strategy they will use. For example, it is much easier to do 18+3 or 23+9 in your head than to write out the calculation.

However, in Key Stage 2 the traditional short written method becomes the standard method. As children move up through Key Stage 2, the complexity of the numbers becomes greater, with Year 3 using up to 3-digit numbers. 4-digit numbers and decimals are introduced in Year 4 (usually in the context of money initially), with Year 5 and 6 working with numbers up to 6-digits and up to 3 decimal places.



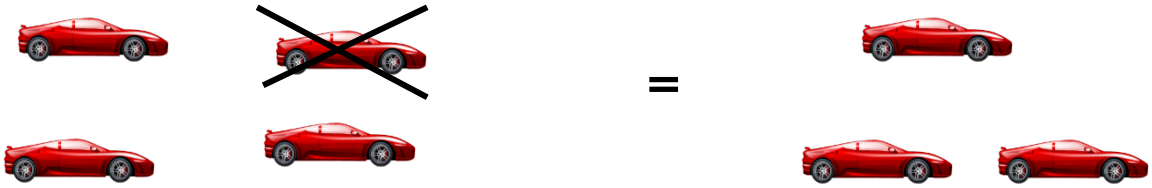
As children move up the Key Stage, complexity is added to the calculations, not just through the number of digits and decimal points, but also through the context in which the question is asked. An example of this might be two-step problems where the children have to work out one thing in order to find the number they need for their next calculation.

Subtraction

In the **Early Years**, subtraction is introduced in a practical context using toys and equipment to solve mathematical problems.

Once children are confident with counting, they start by finding **"one less"** than any given number. This can then be recorded in a simple number sentence.

eg. **4 − 1 = 3**



"One less than 4 is 3"

Once the children are confident finding one less, the children use the same strategies to add single digit numbers. They move onto using a number track or number line to support their calculation by **"counting back".** When subtracting, we encourage the children to record the "jumps" under the line.

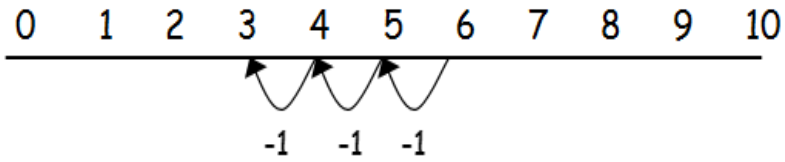
eg. 7 - 3 = 4

At RLK we use jumps **under the line** to represent subtraction

Year 1

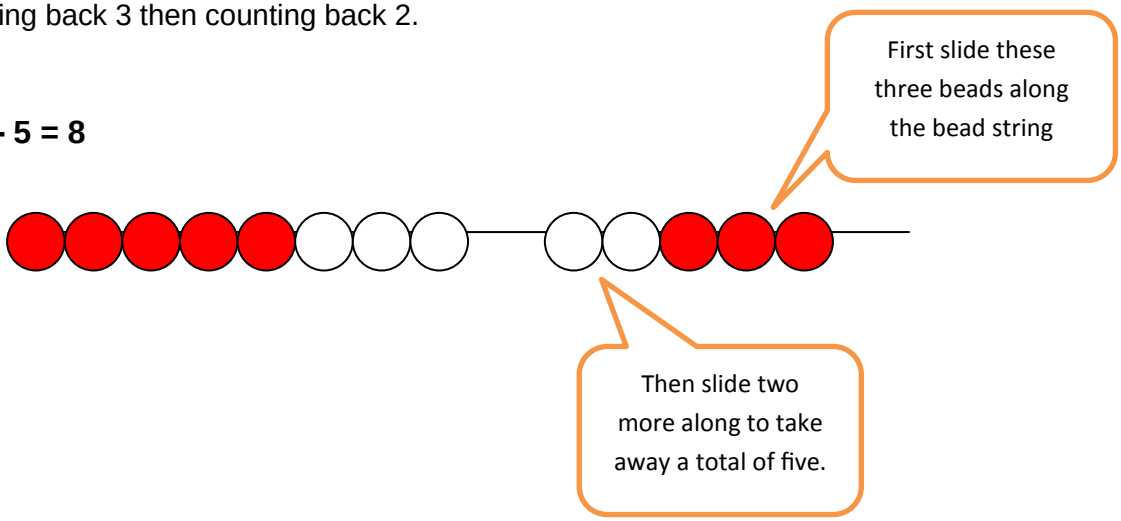
Year 1 continue to use practical resources and number lines to support their calculations. They now move up to using 1-digit and 2-digit numbers up to 20, including zero. They will begin to draw their own number lines.

eg. 6 - 3 = 3

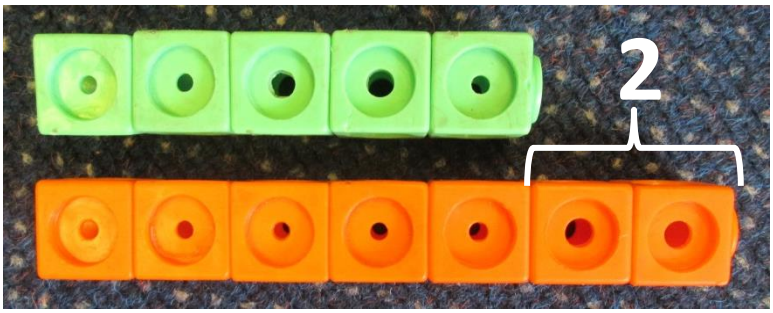


Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

eg. 13 – 5 = 8



They will also be introduced to the concept of "**finding the difference**" as another way of using subtraction. For example, the difference between 5 and 7 is 2.



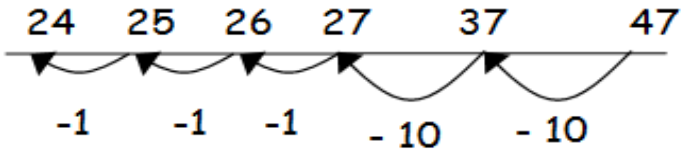
Year 2

The children will continue to rehearse the skills from Year 1 and when they are ready, move onto using more 2-digit numbers, firstly taking a single digit number from a 2-digit number, then taking away a multiple of ten from a 2 digit number and finally taking two 2-digit numbers. They will use number lines and practical equipment to support this.

As the numbers get bigger, we encourage the children to use more efficient "jumps". To do this, they need to have a secure understanding of the place value of numbers.

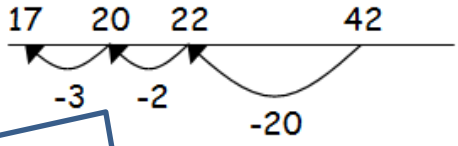
Children are encouraged to "jump back" in tens first and then the units. Number lines are not necessarily drawn to scale, but "tens" jumps are often represented as being bigger than "units" jumps.

eg. 47 - 23 = 24

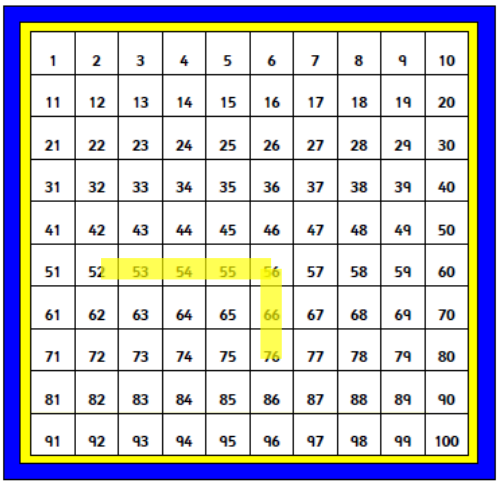


Start by recording 47on the right-hand end of the number line. Count back ten and record the number you landed on. Count back another ten and record the number you land on again. Then repeat this process when taking away the units.

eg. 42 - 25 = 17



Children then move onto taking the units or "ones" away in a more efficient way. For example, by counting back to the "tens number" and then taking off the rest.



A hundred square is another useful image to support the children's learning.

Eg. 76 – 24 = 52

To use the 100 square for this calculation, start on 76. Move up two rows to represent taking away two tens and then count 4 squares to the left to represent taking away 4 units or "ones".

By the end of Year 2, we start to introduce an “expanded method” using vertical columns to get the children ready for the traditional compact method.

At this point there are no “tricky columns” where numbers have to be “exchanged”

Key Stage 2 (Years 3 to 6)

In Key Stage 2, we still encourage the children to use the number line method in their head to work with smaller numbers efficiently and to be selective about the strategy they will use. For example, it is much easier to do 18-9 or 23-4 in your head than to write out the calculation. We also encourage children to use the “find the difference” model to count on when the numbers are close together. For example, for 2001-1997 it is much easier to count on from 1997 to 2001 than to count back or use the short written method.

However, in Key Stage 2 the traditional short written method becomes the standard method. At Robert Le Kyng, we use the **decomposition** method (see below). As children move up through Key Stage 2, the complexity of the numbers becomes greater, with Year 3 using up to 3-digit numbers; 4-digit numbers and decimals are introduced in Year 4 (usually in the context of money initially), with Year 5 and 6 working with numbers up to 6-digits and up to 3 decimal places.

To begin with, children may use an “expanded method” so that it is very clear to them the value of each part of the number. The process they would go through is:

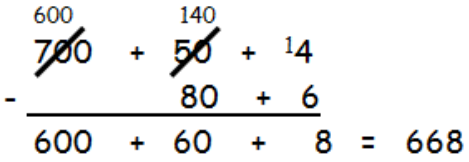
eg

Step 1
700 + 50 + 4
- 80 + 6

Step 2
700 + 40 + 14 (Exchange from tens to units)
- 80 + 6

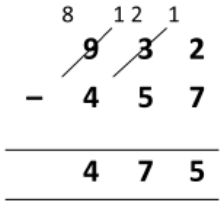
Step 3
600 + 140 + 14 (Exchange from hundreds to tens)
- 80 + 6
600 + 60 + 8

The children would record this as:



Once they are very comfortable with the place value of the numbers they will be encouraged to move onto the “short written method” as this is the most efficient method for calculations that can’t be done in your head.

932 – 457 becomes



Answer: 475

As children move up the Key Stage, complexity is added to the calculations, not just through the number of digits and decimal points, but also through the context in which the question is asked, for example two-step problems where the children have to work out one thing in order to find the number they need for their next calculation.