Year 2

Daisyfield Primary School Calculation Policy

Updated March 2025

Progression Toward Mental Calculation Strategies (Addition and Subtraction)

The ability to calculate mentally is an essential skill, but, as with written methods of calculation, children need to be taught. **It is important to ensure that when teaching particular strategies, children have the appropriate prerequisite skills and are guided as to how and when that strategy is appropriate.**

Children should be taught and encouraged to ask themselves the following questions when faced with a calculation:

- Do I know the answer?
- Can I work it out in my head?
- Do I need to do a jotting?
- Do I need to use a written method?

When using a jotting, there is no requirement to follow a particular method of recording.

A feature of mental calculation is that a type of calculation can often be worked out in several different ways. Which method is best will depend on the numbers involved, the age of the children and the range of methods that they are confident with.

In developing a progression through mental calculation strategies for addition and subtraction, it is important that children understand the relevant concepts, in that addition is:

- combining two or more groups to give a total or sum
- increasing an amount

and subtraction is:

- removal of an amount from a larger group (take away)
- comparison of two amounts (difference)

They also need to understand and work with certain principles, that:

- addition and subtraction are inverses
- addition is commutative i.e. $5 + 3 = 3 + 5$ but subtraction is not $5 - 3$ is not the same as $3 - 5$
- addition is associative i.e. $5 + 3 + 7 = 5 + (3 + 7)$ but subtraction is not $10 - 3 - 2$ is not the same as $10 - (3 - 2)$

Commutativity and associativity mean that calculations can be rearranged, e.g. $4 + 13 = 17$ is the same as $13 + 4 = 17$.

Y2

End of Year Objective:
Add and subtract numbers mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; three one-digit numbers.

Rapid Recall

Children should be able to:

- recall and use addition and subtraction facts to 20 fluently
- derive and use related facts up to 100

Beadstrings are useful for deriving and using related facts up to 100.

60 + 40 = 100

Mental Strategies

Partition and combine multiples of tens and ones

Partitioning numbers is a core strategy for adding and subtracting pairs of numbers. Children can either partition both of the numbers in the calculation, or keep the first number the same and just partition the second. They should be encouraged to use mental methods when adding or subtracting:

- multiples of 10
- TU + or – U (not crossing tens boundaries)
- TU + or – TU (not crossing tens boundaries)

Examples of calculations

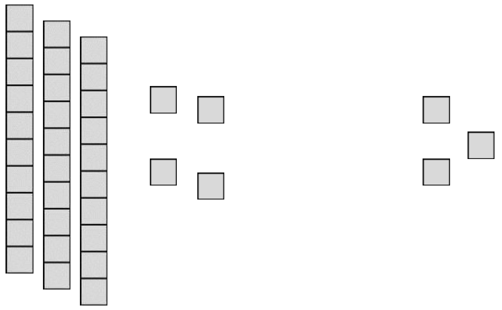
40 + 37	40 add 30 and 7 = 40 add 30 add 7
15 + 14	10 and 5 add 10 and 4 = 10 add 10 add 5 add 4 or 15 add 10 add 4
37 + 12	37 add 10 and 2 = 37 add 10 add 2
78 – 42	78 take away 40 and 2 = 78 take away 40 take away 2
80 – 35	80 take away 30 and 5 = 80 take away 30 take away 5

Prerequisite skills:

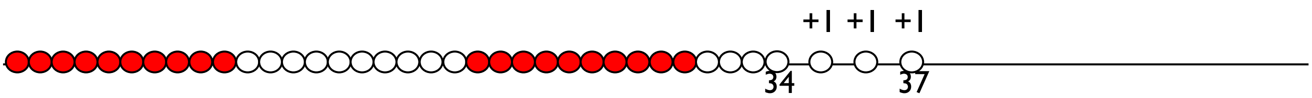
- Count using one to one correspondence
- Count forwards and backwards in ones and tens from any one- or two-digit number
- Understand place value, understand which digit represents tens and which digit represents ones and identify what changes if one is added or subtracted, and what changes if ten is added or subtracted.
- Partition numbers into tens and ones

Addition

34 + 3 = 37 (shown using Base 10 equipment)



34 + 3 = 37 (shown using a beadstring)

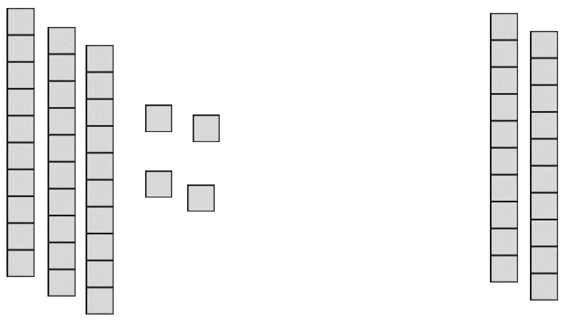


34 + 3 = 37 (shown using a numberline)

34 + 20 = 54 (shown using Base 10 equipment)

Children could use Base 10 equipment to calculate this as:

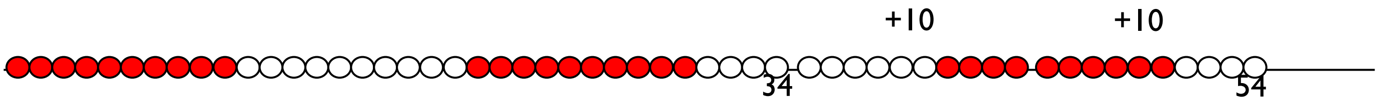
30 + 20 = 50
50 + 4 = 54



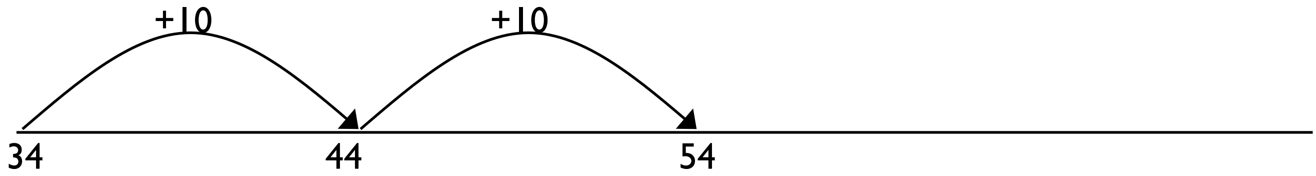
34 + 20 = 54 (shown using a beadstring)

Children could use a beadstring to calculate this as:

34 + 10 = 44
44 + 10 = 54



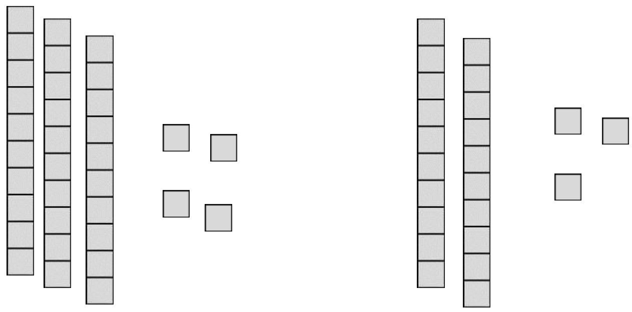
34 + 20 = 54 (shown using a numberline)



34 + 23 = 57 (shown using Base 10 equipment to partition both numbers)

Children could use Base 10 equipment to calculate this as:

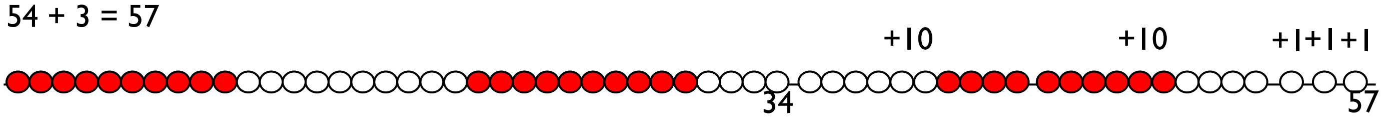
30 + 20 = 50
4 + 3 = 7
50 + 7 = 57



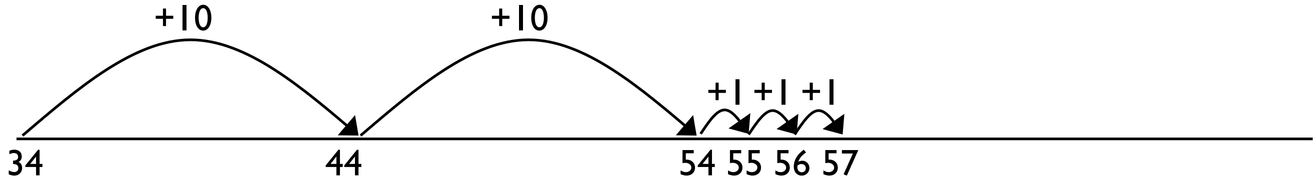
34 + 23 = 57 (shown using a beadstring to keep the first number the same and just partition the second)

Children could use a beadstring to calculate this as:

34 + 10 = 44
44 + 10 = 54
54 + 3 = 57

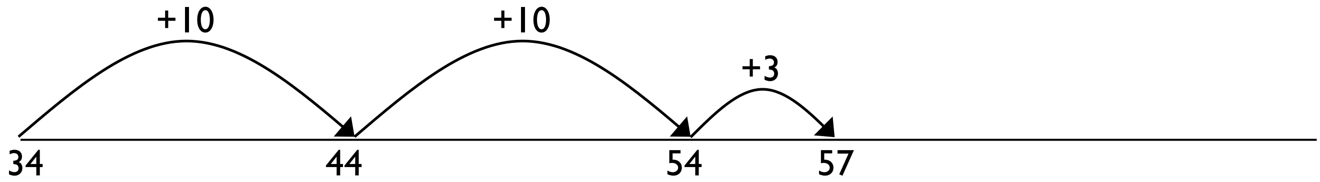


34 + 23 = 57 (shown using a numberline to keep the first number the same and just partition the second)



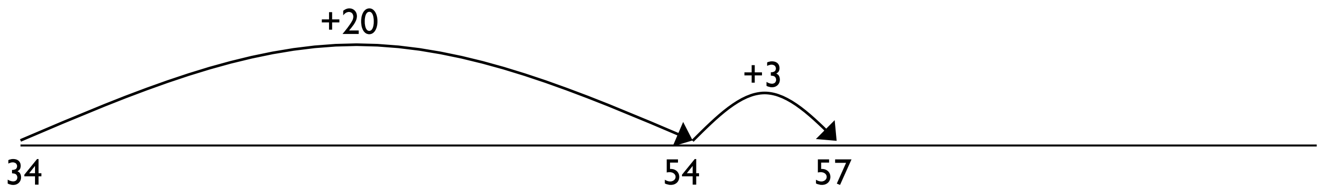
Encourage children to become more efficient by adding the units in one jump (by using the known fact 4 + 3 = 7).

34 + 23 = 57



Followed by adding the tens in one jump and the units in one jump.

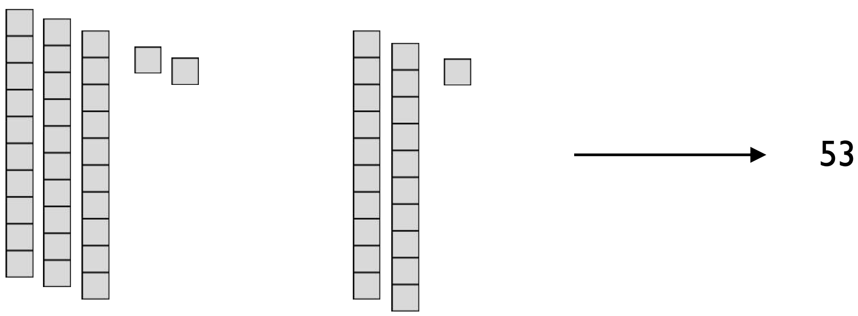
34 + 23 = 57



WRITTEN ADDITION

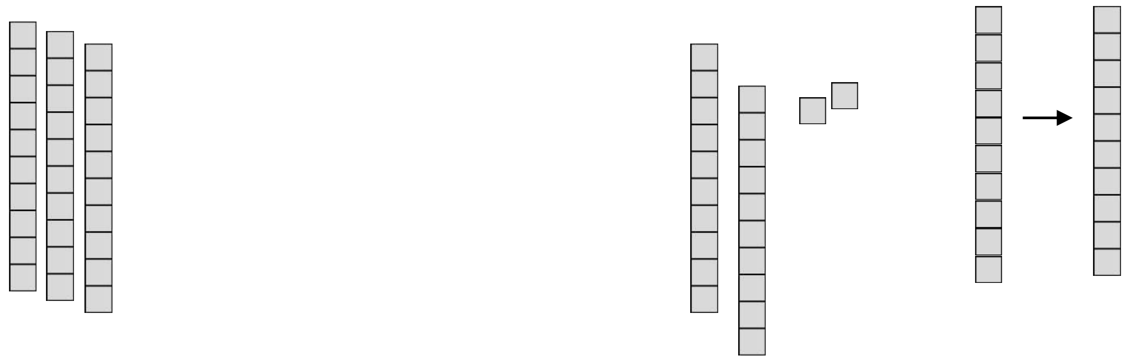
End of Year Objective:
Add numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers; three one-digit numbers.

Children will continue to use the Base 10 equipment to support their calculations. For example, to calculate 32 + 21, they can make the individual amounts, counting the tens first and then count on the units.

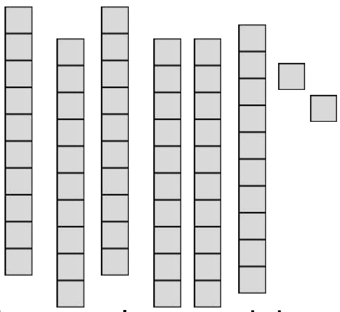


When the units total more than 10, children should be encouraged to exchange 10 units/ones for 1 ten. This is the start of children understanding 'carrying' in vertical addition. For example, when calculating 35 + 27, they can represent the amounts using Base 10 as shown:

Then, identifying the fact that there are enough units/ones to exchange for a ten, they can carry out this exchange:

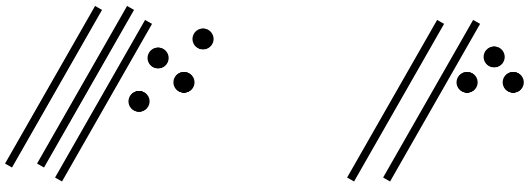


To leave:



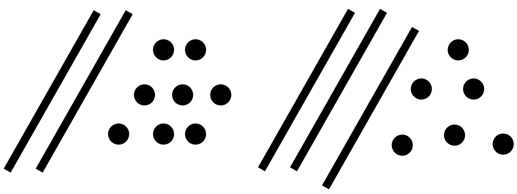
Children can also record the calculations using their own drawings of the Base 10 equipment (as slanted lines for the 10 rods and dots for the unit blocks).

e.g. 34 + 23 =

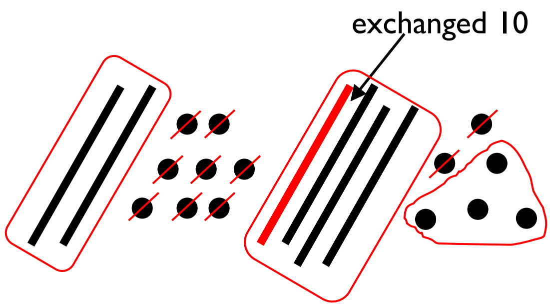


With exchange:

e.g. 28 + 36 =



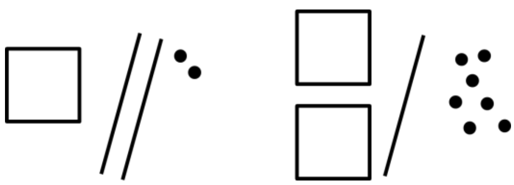
will become



so 28 + 36 = 64

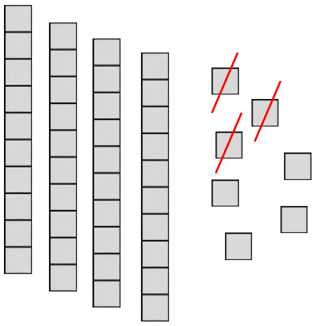
It is important that children circle the remaining tens and units/ones after exchange to identify the amount remaining.

This method can also be used with adding three digit numbers, e.g. 122 + 217 using a square as the representation of 100.

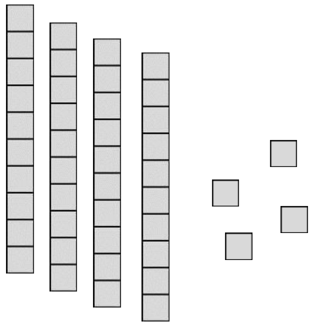


MENTAL SUBTRACTION

47 – 3 = 44 (shown using Base 10 equipment)

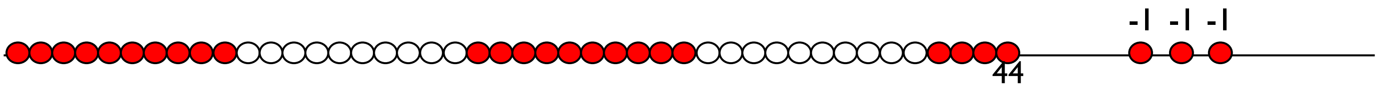


which leaves

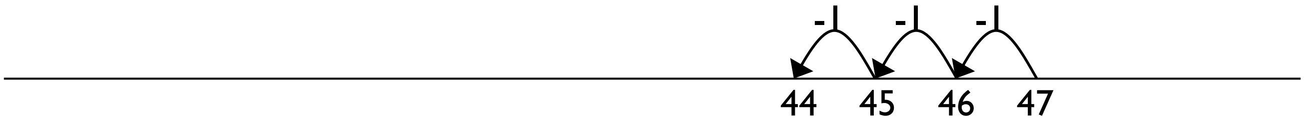


so 47 – 3 = 44

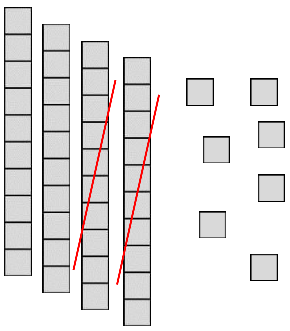
47 – 3 = 44 (shown using a beadstring)



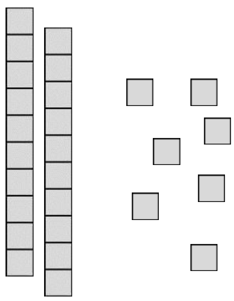
47 – 3 = 44 (shown using a numberline)



47 – 20 = 27 (shown using Base 10 equipment)



which leaves

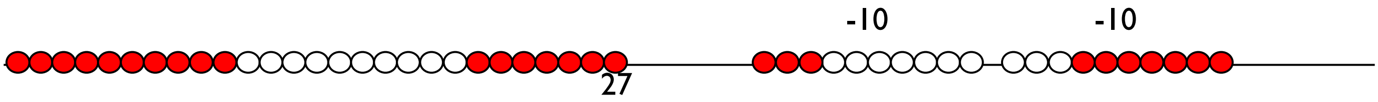


so 47 – 20 = 27

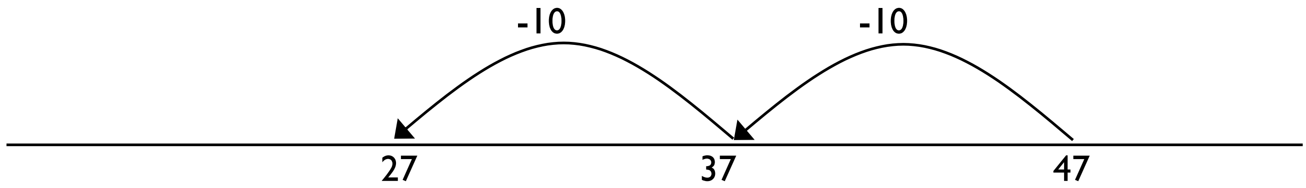
47 – 20 = 27 (shown using a beadstring)

Children could use a beadstring to calculate this as:

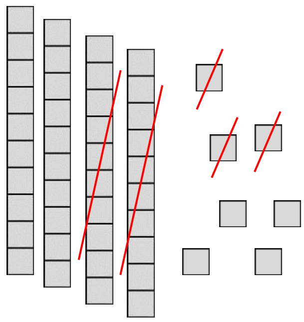
47 – 10 = 37
37 – 10 = 27



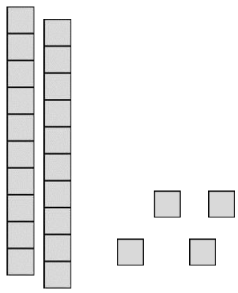
47 – 20 = 27 (shown using a numberline)



47 – 23 = 24 (shown using Base 10 equipment)



which leaves

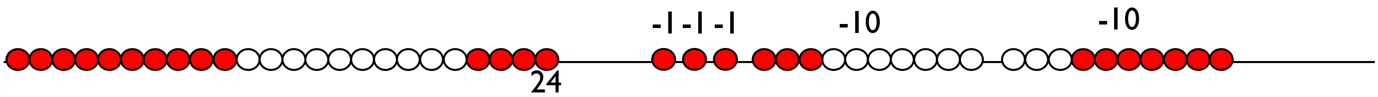


so 47 – 23 = 24

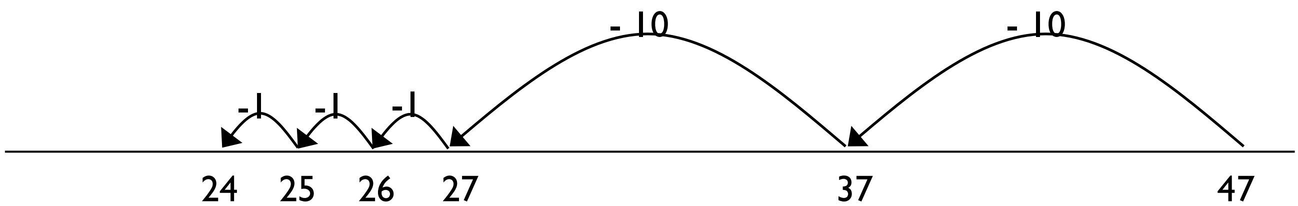
47 – 23 = 24 (shown using a bead string)

Children could use a bead string to calculate this as:

47 – 10 = 37
37 – 10 = 27
27 – 3 = 24

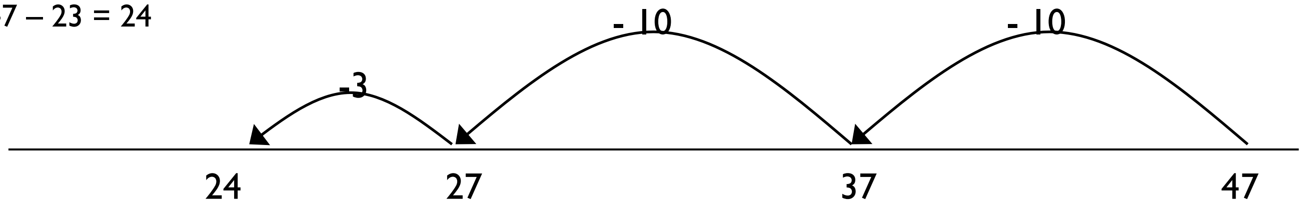


47 – 23 = 24 (shown using a number line)



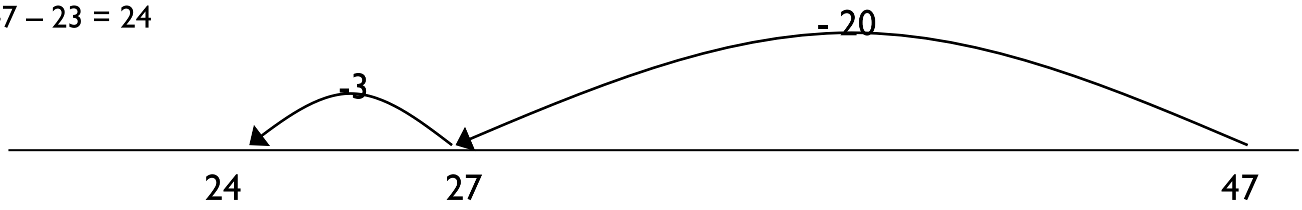
Encourage children to become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4).

47 – 23 = 24



Followed by subtracting the tens in one jump and the units in one jump.

47 – 23 = 24



Reorder numbers in a calculation

In Y2, children need to recognise that they can rearrange an addition, but not a subtraction. They also need to understand that the principle behind reordering a calculation is to make it more efficient, particularly when utilising a counting on strategy. Children need to be encouraged to identify calculations which should be reordered and those that are already in the most efficient format. When adding three single digit numbers, reordering should be based on number bonds or doubles with which the child is familiar.

Examples of calculations:

5 + 34	34 + 5
42 +11	doesn't need reordering as the greater number is first already
5 + 7 + 5	5 + 5 + 7 (utilising knowledge of number bonds or doubles)

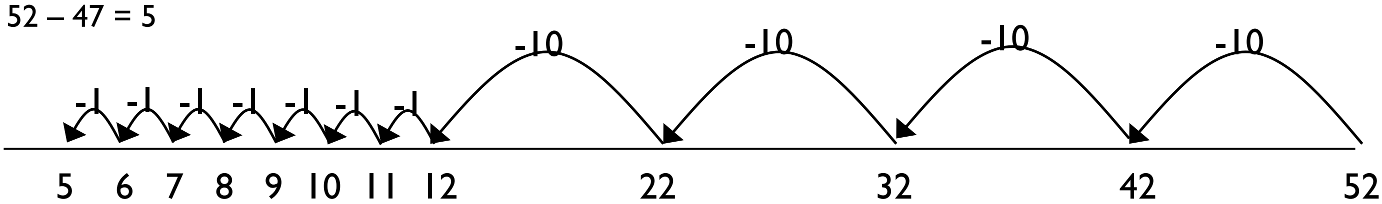
Prerequisite skills:

- Understand the place value of numbers to identify which number is the greater
- Understand that reordering works for addition but not subtraction* *(because children are not at the level when they are solving calculations such as 16 – 3 – 6, when reordering would be appropriate).*

Find a small difference by counting up from the lesser to the greater number

Children should, using their knowledge of place value, be able to identify when numbers are close together. When that is the case, it is more efficient, when subtracting, to count on to find the difference, rather than taking away. For example, in the calculation 52 – 47, to solve this by:

52 – 47 = 5



is far less efficient than:

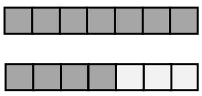
For children to use this method with understanding, it is important that they understand how counting on links to subtraction.

Initially, they should look at simple numbers to develop an understanding of the concept of difference and counting on. For example, with 7 – 4, they can make two towers, one of 7 cubes and one of 4 cubes (Step 1). The calculation can be phrased as ‘How many more do we need to make the towers the same size?’ To answer this question, the children can add cubes of a different colour onto the smaller tower until they are the same height.

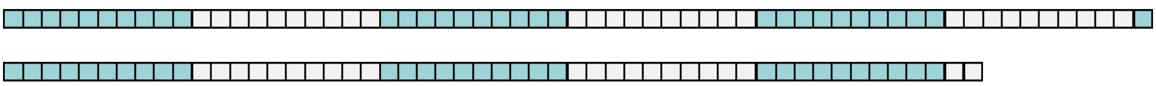
Step 1 Step 2

3 more cubes are needed to make them the same size, so the difference between 7 and 4 is 3. This could be compared to taking away 4 from 7 so that children can see that it is the same answer.

The next stage from this would be to encourage children to use the cubes to make lines rather than towers.

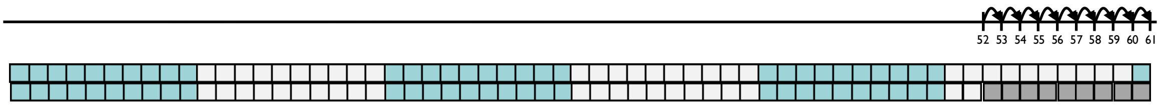


Once children can find the difference using this method using numbers up to 20, they can continue to use this strategy to solve calculations with two-digit numbers, using base 10 materials rather than cubes. For example, with the calculation 61 – 52, children can use base 10 to set out two lines, one for each number (the base 10 in the illustration are two colours to enable tens to be identified, this does not need to be the case with the materials children are using).



To find how many more are needed, or the difference, children would use a second colour of base ten ones to make the lines the same:

To make this a more sustainable method, it can be modelled alongside a number line jotting, e.g.



Examples of calculations

52 – 47
74 – 66
81 – 79
32 - 25

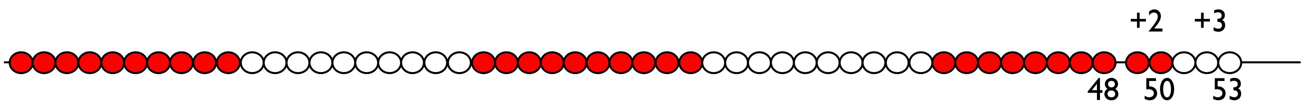
Prerequisite skills:

- Understand the place value of numbers to identify which number is the greater or lesser
- Place numbers on a partially marked and then unmarked number line
- Establish whether numbers are close together
- Count forwards and backwards in ones and tens form any one- or two-digit number

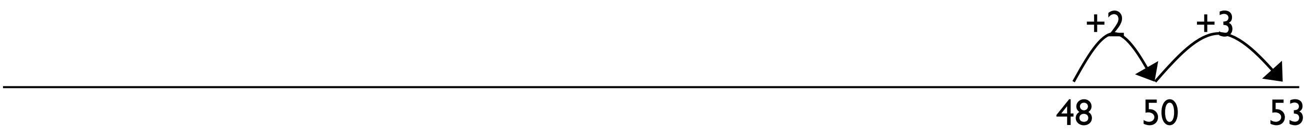
Begin to bridge through 10 when adding a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3)

Use of the bridging strategy relies heavily on children's efficient and accurate recall of number bonds to 10 or how far away a number is from a multiple of 10 (*see use of 10 frames in Year 1*). When calculating, e.g. 48 + 5, consider using bead strings or different coloured blocks of 10 cubes to illustrate it as 48 + 2 + 3 using the natural colour demarcations in the bead string to support this identification. This can also be shown using 10 frames (*see Year 1 'Partition small numbers' section for more information*).

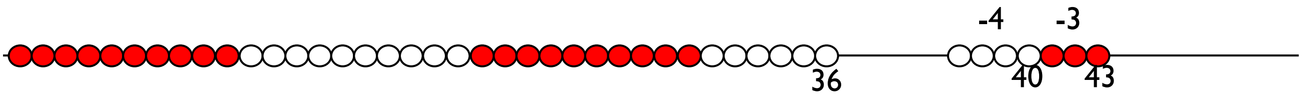
48 + 5 = 53



48 + 5 = 53



43 – 7 = 36



43 – 7 = 36

Examples of calculations

25 + 6	as 25 + 5 + 1
12 – 7	as 12 - 2 - 5
66 + 7	as 66 + 4 + 3
43 – 7	as 43 - 3 - 4

Prerequisite skills:

- Partition numbers in different ways, e.g. 5 as 2 + 3 to enable 58 + 5 as 58 + 2 + 3
- Know, or quickly derive, number bonds to 10

Add or subtract 9 and 19 by rounding and compensating

Children need to understand both the number system and number bonds in order to understand how to use a compensation method.

For adding 9, children should be shown how to add nine by using base 10 materials and then add ten to the same number to identify what would need to be adjusted to make the calculation correct, e.g. 23 + 9

23 + 9

23 + 10 is one too many, so I have to subtract one

NB Teaching children to add nine on a hundred square without developing their understanding will not support their ability to understand and use this method effectively.

Examples of calculations

34 + 9	as 34 + 10 - 1
77 + 19	as 77 + 20 - 1, or 77 + 10 + 10 - 1
46 - 9	as 46 - 10 + 1
63 - 19	as 63 - 20 + 1, or 63 - 10 - 10 + 1

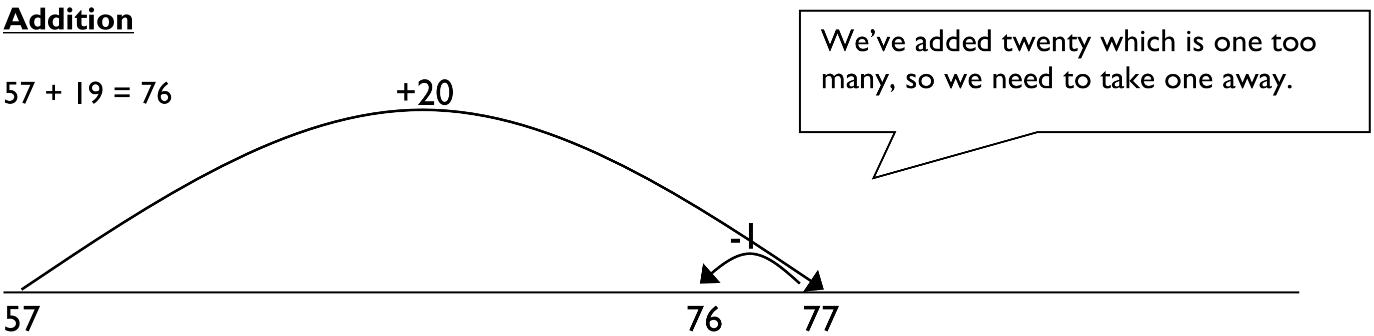
Prerequisite skills:

- Understand the relationship between 9 and 10 (i.e. a difference of 1)
- Be able to show visually using base 10 equipment

Empty numberlines could be used to model the calculation.

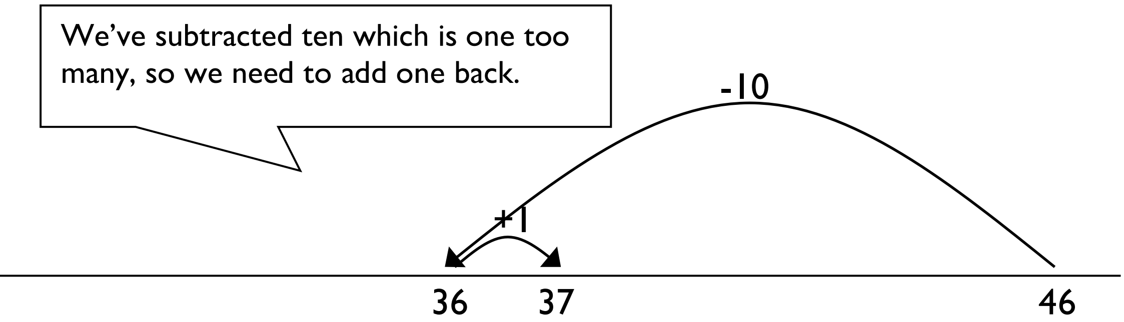
__Addition__

57 + 19 = 76



Subtraction

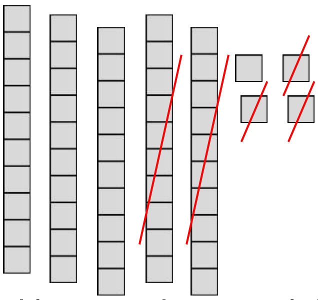
46 - 9 = 37



WRITTEN SUBTRACTION

End of Year Objective:
Subtract numbers using concrete objects, pictorial representations, and mentally, including: a two-digit number and ones; a two-digit number and tens; two two-digit numbers.

Children will begin to use the Base 10 equipment to support their calculations, still using a take away, or removal, method. They need to understand that the number being subtracted does not appear as an amount on its own, but rather as part of the larger amount. For example, to calculate 54 - 23, children would count out 54 using the Base 10 equipment (5 tens and 4 units). They need to consider whether there are enough units/ones to remove 3, in this case there are, so they would remove 3 units and then two tens, counting up the answer of 3 tens and 1 unit to give 31.



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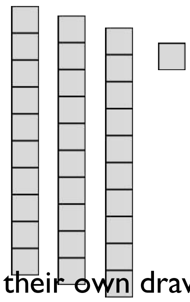
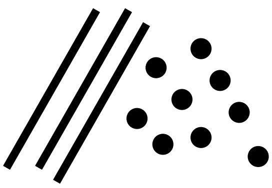
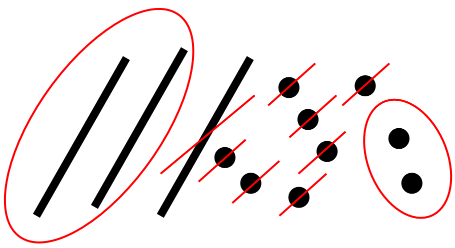


so 54 – 23 = 31

Children can also record the calculations using their own drawings of the Base 10 equipment (as slanted lines for the 10 rods and dots for the unit blocks), e.g. to calculate 39 – 17 children would draw 39 as 3 tens (lines) and 4 units (dots) and would cross out 7 units and then one ten, counting up the answer of 2 tens and 2 units to give 22.

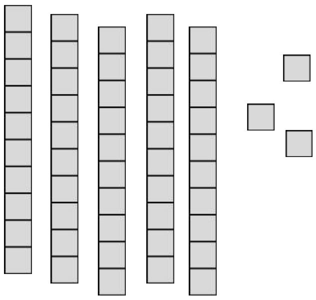




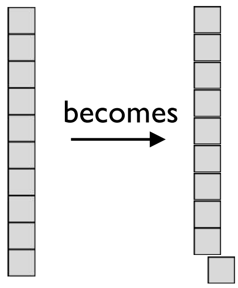
Circling the tens and units that remain will help children to identify how many remain.

When the amount of units to be subtracted is greater than the units in the original number, an exchange method is required. This relies on children's understanding of ten units being an equivalent amount to one ten. To calculate 53 – 26, by using practical equipment, they would count out 53 using the tens and units, as in Step 1. They need to consider whether there are enough units/ones to remove 6. In this case there are not so they need to exchange a ten into ten ones to make sure that there are enough, as in step 2.

Step 1

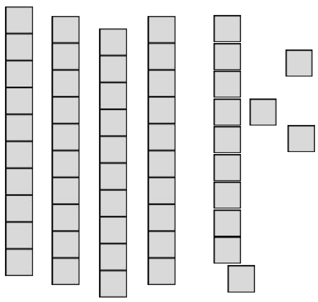


Step 2

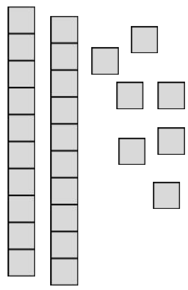


The children can now see the 53 represented as 40 and 13, still the same total, but partitioned in a different way, as in step 3 and can go on to take away the 26 from the calculation to leave 27 remaining, as in Step 4.

Step 3

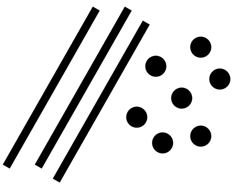


Step 4

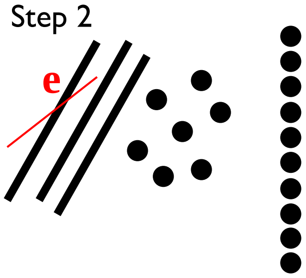


When recording their own drawings, when calculating 37 – 19, children would cross out a ten and exchange for ten units. The exchanged ten is denoted with an **e** so children recognise this has not been subtracted. Drawing the units in a vertical line, as in Step 2, ensures that children create ten ones and do not get them confused with the units that were already in place.

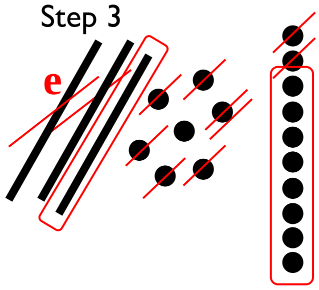
Step 1



Step 2



Step 3



Progression Towards Written Calculation Strategies – Multiplication

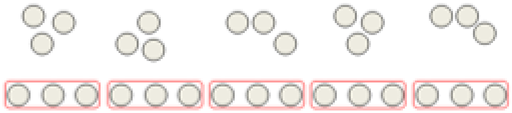
Recognise multiplication as real arrays and understand that multiplication is repeated addition and the total can be found by counting in equal steps/groups.

Concrete – real arrays e.g. baking trays, ice cube trays, egg boxes, cubes, counters

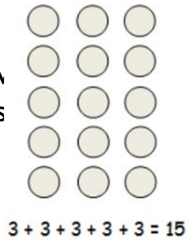
Pictorial – images of real arrays, rectangles drawn on squared paper

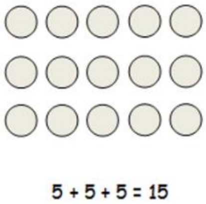
How many eggs are needed to fill the box?
How many eggs would fill two boxes?

Children arrange items into equal grou
and count to find the total.



Children understand how arrays can show
repeated addition of rows and/or columns
and that multiplication is commutative i.e.
that 3 x 5 gives the same answer as 5 x 3



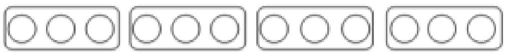


Progression Towards Written Calculation Strategies – Division

Represent division calculations as grouping (repeated subtraction) and use jottings to support their calculation. Introduce simple remainders as the items are shared into equal parts, but some may be left over.

Concrete – real sets of items, cubes, counters
Pictorial – images real items, rectangles drawn on squared paper

12 ÷ 3 = ?
Children begin to read this calculation as,
'How many groups of 3 are there in 12?'



At this stage, children will also be introduced
to division calculations that result in remainders.

13 ÷ 4 = 3 remainder 1