A Parent Guide to Support Addition and Subtraction Strategies in Year 2

<u>A Brief Glance of the Expectations</u>

In Year R children learn to become familiar with numbers to 20. They experiment with adding and taking away, learning to count on and back. They partition numbers in different ways.

In Year 1 children learn to count to and from 100, knowing the next number in the sequence. They are expected to become very confident with adding and subtracting single digit numbers. They begin to learn by heart the addition facts which equal 10 e.g. 4 + 6, 7 + 3 and their related subtraction facts e.g. 10 – 6, 10 – 3 etc. They also learn number facts for values up to 10 e.g. 6 + 3 = 9, 9 – 3 = 6, 5 + 3 = 8, 8 – 3 = 5 etc.

In Year 2 children develop further an understanding of 2-digit numbers and apply the single digit number facts learnt to solving problems with 2-digit numbers e.g. I know 5 + 3 = 8, so 15 + 3 = 18 and 50 + 30 = 80. I also know that 7 – 3 = 4, so 17 – 13 = 4 and 70 – 30 = 40

In Year 3 the children move onto learning about numbers in the hundreds, using all the key facts previously taught.

Adding on the empty number line (no bridging)

Most children are expected to be able to do this in the Autumn term of Year 2, having spent a lot of time in Year 1 learning single digit number facts and knowing with confidence the numbers to 100, including counting in tens and knowing 1 more and 10 more than any 2-digit number.

Example 45 + 23 =

1. Look for the biggest number.

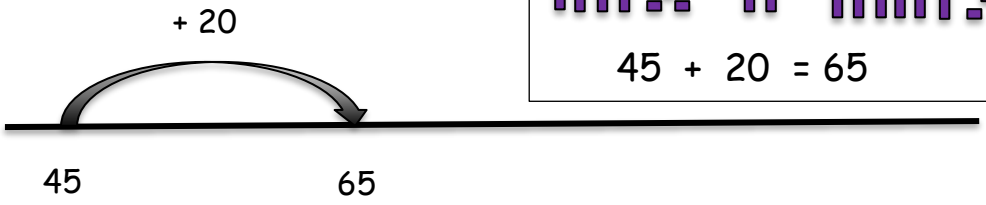
2. Draw a number line and put the biggest number under the line (at the left hand side of the line).

45

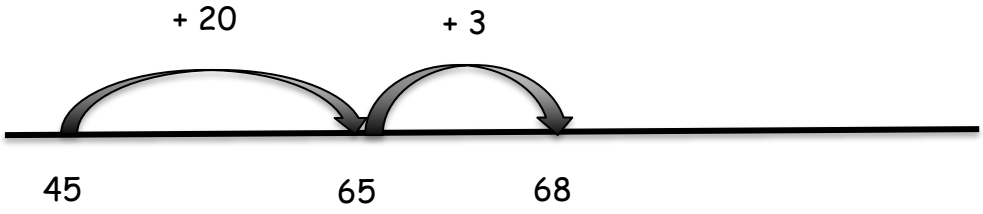
3. Look at the number you need to add on – begin by adding the tens…
   Record the jump above the arch and remember to write where you land, so you can easily keep track of where you are. This is also a way to prove to others that your answer is correct.

In order to jump 20, you need to have learnt to count on in tens starting from any value. You also need to be secure with place value, knowing that only the tens digit changes when you add a multiple of ten. Working practically with tens and ones apparatus and drawing pictures is encouraged initially.

45 + 20 = 65



4. Look again at the number you are adding on and see how many ones it has. Draw an arch and add on the ones.
   In order to do this quickly, you should learn your single digit addition facts by heart, e.g. I know 5 + 3 = 8, so 65 + 3 = 68.



5. Finally record the answer

45 + 23 = 68

Pictures can help in the early stages to show what is happening to the numbers.

65 + 3 = 68

Adding on the empty number line (bridging/ crossing tens)

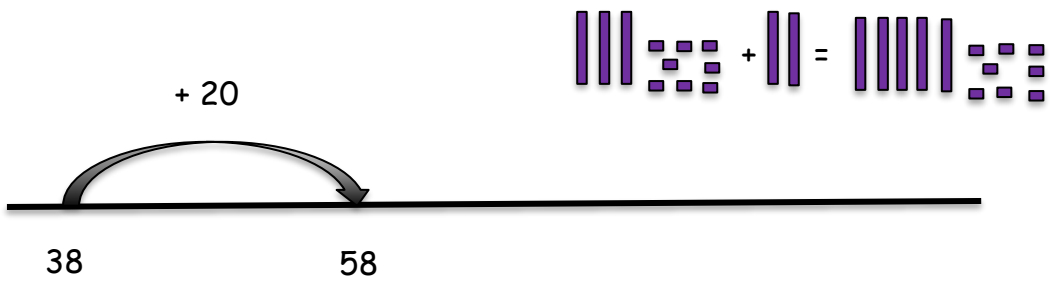
Most children are expected to be able to do this in the **Spring term of Year 2, having developed further recall of the number facts for 10 and for any value up to 10, as well as mentally recalling 10/20/30 more than any 2-digit number.** By the summer term the children should be able to mentally solve these questions.

Example 38 + 26 =

1. Look for the biggest number.

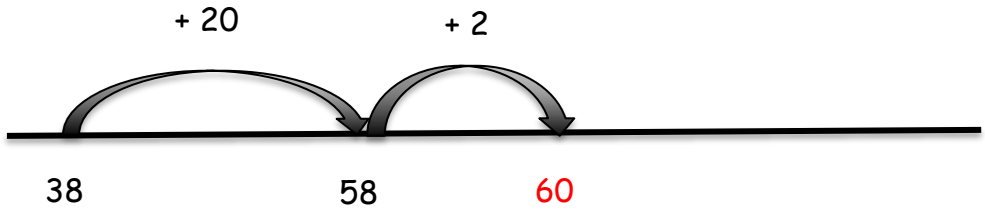
2. Draw a number line and put the biggest number under the line (at the left hand side of the line).

3. Look at the number you need to add on – begin by adding the tens…
   Record the jump above the arch and remember to write where you land, so you can easily keep track of where you are. This is also a way to prove to others that your answer is correct.



4. Look again at the number you are adding on and see how many ones it has. Because adding 6 onto 8 will cross into a new tens number (from the 50s into the 60s, in this example) it is easier to partition the ones number into two smaller parts shown below. (This method avoids an inefficient (slower) method of counting on in ones)…

   First we look at what we need to jump to reach the next multiple of ten (60). In this example we need 2 (because we've learnt by heart our facts for 10, we know that 8 + 2 will reach a multiple of ten). It is this step that is referred to as bridging (bit like crossing a bridge into a new tens number).



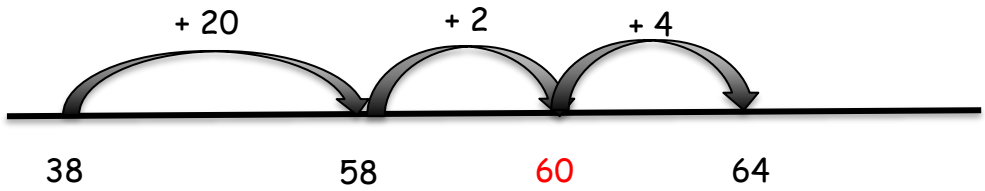
The children are encouraged to look back at the calculation and write above the number 6, how they have partitioned it…

2 + 4

38 + 26 =

Hopefully the children will have learnt by heart all the number facts for values up to 10 and will quickly be able to say that they have 4 left to add on, because we know 2 + 4 = 6. Children who haven't yet learnt their number facts can use fingers to help them.

5. Next we add on the 4. This is the easiest part of the calculation, because we've learnt that any single digit number when added to a multiple of ten, sits where the zero sat. (This is why we jump to the multiple of ten first, because it makes the last stage very easy.)



6. Finally record the answer $38 + 26 = 64$

Why this method?

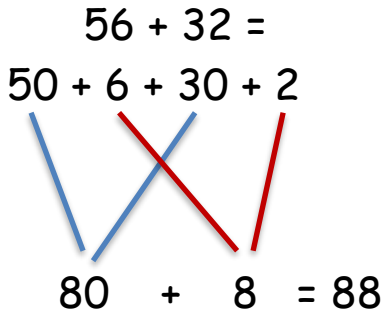
The process of using an empty number line develops strong mental skills i.e. adding tens, jumping to multiples of ten, partitioning numbers and recombining, which are all essentials in mathematics. The line itself is simply a way of recording the process. By the end of year 2 it is expected that children can begin to solve such questions in their heads.

But what about vertical methods?

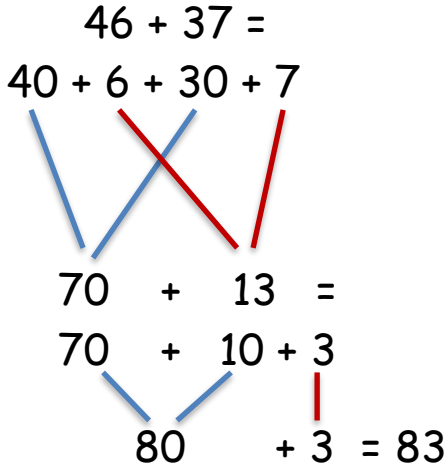
The use of vertical methods is mainly introduced at KS2, it is particularly useful for larger numbers, which are hard to keep in your head. Even though the vertical method can appear easier, because you are simply lining up the ones and tens, it isn't necessarily the most efficient, particularly when bridging. If you use this method at home it is important to use the correct maths vocabulary to avoid misconceptions in the future e.g. whilst in the tens column say 60 or 6 tens rather than just 6.

<u>Other methods in KS1</u>

Before using the empty number line strategy, the children are taught (using tens and ones apparatus) to put the tens together and the ones together. This can be recorded as follows and is a pre cursor to the use of vertical methods…



This method can also be used when a question involves bridging, but only if the child has learnt by heart their number facts for 20…



If children have learnt by heart their double facts e.g. 6 + 6 = 12, then calculations such as 6 + 7 (known as a near double fact) become easy to learn because it is only one more.

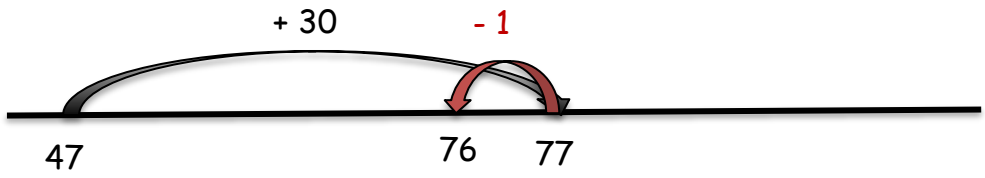
Adding numbers ending in 9

When the children are confident with the previous strategies we begin to introduce other ideas, which can sometimes be more efficient mentally. For example when adding 9 or 19 or 29 to a number, we will instead add 10 or 20 or 30 respectively and subtract one.

This is quicker than partitioning (bridging) because the child is confident at adding multiples of 10 and knows by heart one less than any value to 100.

47 + 29 =

47 + 30 - 1 =



47 + 29 = 76

Subtracting on an empty number line (no bridging)

Subtraction follows the same steps as addition, just backwards!

Example 48 - 23 =

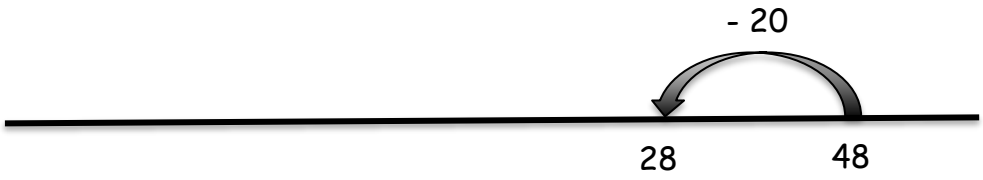
1. Look for the starting number i.e. the total at the beginning of a subtraction calculation.

2. Draw a number line and put this number under the line (at the right hand side of the line).

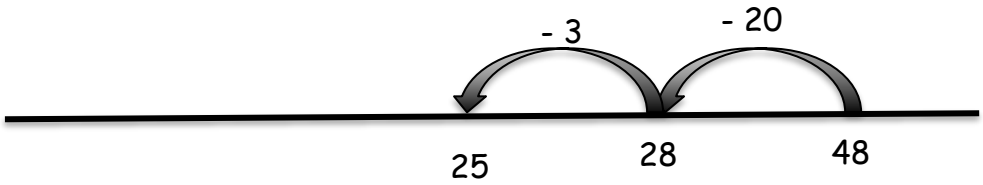
3. Look at the number you need to subtract – begin by taking away the tens…
   Record the jump above the arch and remember to write where you land, so you can easily keep track of where you are. This is also a way to prove to others that your answer is correct.

In order to jump back 20, you need to have learnt to count back in tens starting from any value. You also need to be secure with place value, knowing that only the tens digit changes when you subtract a multiple of ten. Working practically with tens and ones apparatus and drawing pictures is encouraged initially.

48 - 20 = 28



4. Look again at the number you are taking away and see how many ones it has. Draw an arch and subtract the ones. In order to do this quickly, you should learn your single digit subtraction facts by heart, e.g. I know 8 - 3 = 5, so 28 - 3 = 25



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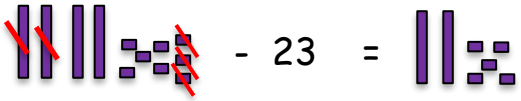


48 - 23 = 25

Subtracting on the empty number line (bridging/ crossing tens)

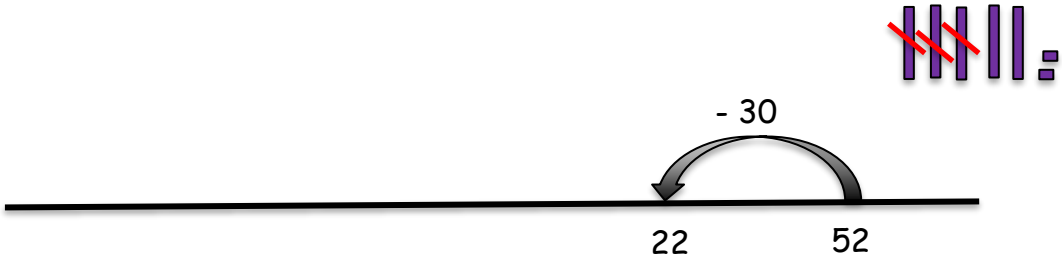
By the summer term children should be able to solve subtraction calculations that involve bridging, using an empty number line or resources. It is not expected that they can solve these in their head (although the process itself uses mental calculations), but it is an expectation for the level of greater depth.

Example 52 - 37 =

1. Look for the starting number.

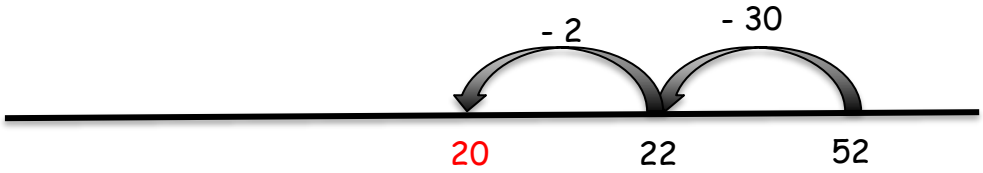
2. Draw a number line and put the starting number under the line (at the right hand side of the line).

3. Look at the number you need to subtract – begin by taking away the tens…
   Record the jump above the arch and remember to write where you land, so you can easily keep track of where you are. This is also a way to prove to others that your answer is correct.



4. Look again at the number you are subtracting and see how many ones it has. Because subtracting 7 will cross into a new tens (from the 20s to the 10s, in this example) it is easier to partition the ones number into two smaller parts shown below. (This method avoids an inefficient (slower) method of counting back in ones).

   First we look at what we need to jump back to reach the previous multiple of ten (20). In this example we need to subtract the 2 ones (because we have previously learnt that if we subtract the ones we'll be left with the tens number), so 22 – 2 = 20. It is this step that is referred to as bridging (bit like crossing a bridge, which will lead into a new tens number).



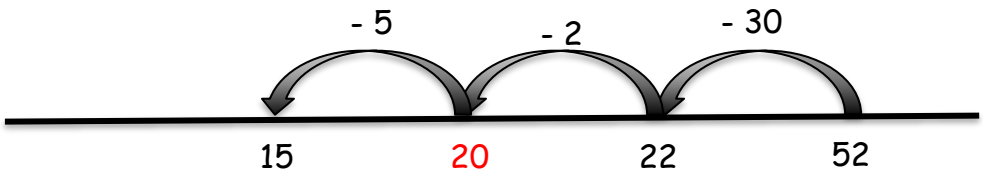
The children are encouraged to look back at the question and to write above the number 7, how they have partitioned it…

2 + 5

52 - 37 =

Hopefully the children will have learnt by heart all the number facts for values up to 10 and will quickly be able to say that they have 5 left to take away, because we know 2 + 5 = 7. Children who haven't yet learnt their number facts can use fingers to help them.

5. Next we subtract the 5. This should be an easy part of the calculation, because we've learnt our subtraction facts from 10, so if we know 10 – 5 is 5, then 20 – 5 is 15, 30 – 5 is 25 etc.



6. Finally record the answer 52 - 37 = 15

Things to consider

When children start learning these methods common errors include not subtracting the correct ones number. In the example above we can see that 37 has been taken away (30, then 2 then 5), make sure your child checks this at the end of their calculation. If a child simply jumps back 30 then 7, it's more likely that they counted back in 1s to reach their answer, which is not very efficient. The method above relies on a strong knowledge of number facts and therefore should be quick to use.

The best help you can give your child, from when they enter Year 1 is to practise learning the addition and subtraction facts for all values to 10. This can be practised through games to make it fun. Number fact cards are available to download from our school website with ideas for activities.

Vertical Methods

The use of vertical methods for subtraction is introduced at KS2 (see comment in the addition section). A subtraction bridging question requires the skill of exchanging a ten into ones.

At KS1 we focus on keeping the first number whole, rather than partitioning it into tens and ones, to avoid errors…

56 - 32 =

56 - 30 – 2 =

26 - 2 = 24

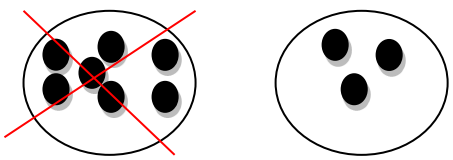
Earlier steps - Solving single digit subtraction calculations

Initially children are taught to subtract by taking objects away from a set/total. They are also shown the process of counting back on a structured number line (a number line that has numbers written on it).

Once addition facts have been learnt we use these to help with our subtraction facts e.g.

I know 5 + 4 = 9, so if I start with 9 and take 4 away, 5 will be left.

Using resources helps to show how addition and subtraction facts are related…



I know 7 spots + 3 spots always equals/ makes 10 spots

so if I start with 10 spots and take 7 spots away I'll be left with 3 spots.

Any support you can give to these concepts will be very beneficial for your child.
Many thanks.