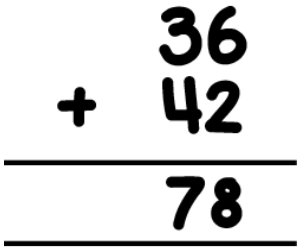
Column methods we use at St Barnabas

Calculating with Big Maths

ADDITION

Step 1

I can solve a 2d + 2d



This is the step where children are first introduced to a Column Method.

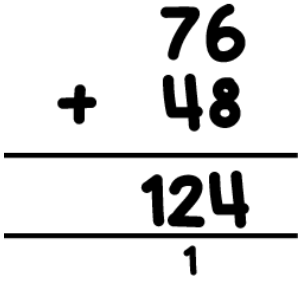
Children should be taught this step after 'Basic Skills: Addition: Step 24' which provides the understanding to underpin the Column Method.

Confirming that the foundations of understanding are in place at this point is crucial, as all future column addition steps can be more quickly understood without the need to unpick them in great detail.

Note that here children are not 'crossing 10' with the total of each column, hence they are solving a 2d + 2d question but not *any* 2d + 2d question.

Step 2

I can solve any 2d + 2d



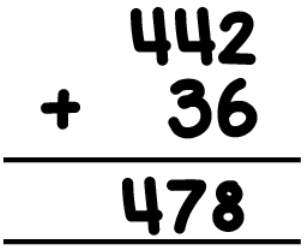
Children should be taught this step after 'Basic Skills: Addition: Step 25' which will provide the understanding to underpin the 'doing' of this step - particularly visualising the 'carrying of the 10'.

Therefore, children will only be entering this step once they are competent with all 1d + 1d 'Learn Its', so that finding the total of each column is a non-issue.

The new learning for the child here is to 'carry the 10' and remembering to add it to the total of the tens column. Every child should have completely mastered this skill before moving on as it will be used again and again in future steps.

Step 3

I can solve a 3d + 2d

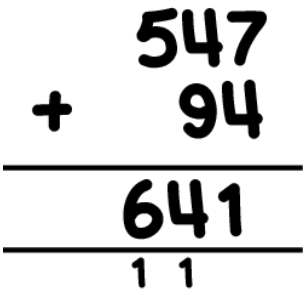


Here, the hundreds column is used for the first time. To isolate the new skill of coping with the hundreds column, we retreat to units and tens columns that don't cross 10.

The understanding foundations for this step are found in 'Basic Skills: Addition: Step 26'.

Step 4

I can solve any 3d + 2d

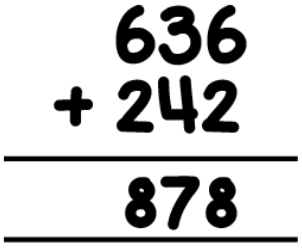


The understanding foundations for this step are found in 'Basic Skills: Addition: Step 27'. It is important to check all children *do* have the understanding that underpins this Column Method Step. However, many children will quickly progress when they hit this step since they are now crossing 10 with totals, which they have already accomplished.

The new learning here is to carry a 1 from the tens column total into the hundreds column. This '1' of course is really a hundred! It is from this point onwards that teachers must judge to what degree to explain the understanding behind every moment of 'doing'. Some children will continue to understand every moment of 'doing'. However, some won't and therefore we can see the need to have ensured the understanding foundations being linked to the first 3 steps (Step 1, Step 2 and Step 3).

Step 5

I can solve a 3d + 3d



Here we use the hundreds column for both numbers for the first time. To isolate the new skill of coping with both hundreds columns, we again retreat to units and tens columns that don't cross 10.

The understanding foundations for this step are found in 'Basic Skills: Addition: Step 28'.

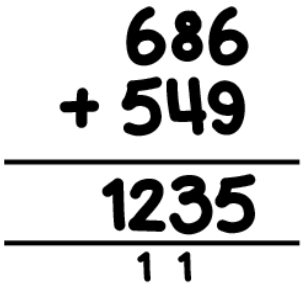
It is also useful to extend this step into the addition of two amounts of money (e.g. £3.45 + £5.22), the understanding foundations for this are found in 'Basic Skills: Addition: Step 30'.

Where there is no 'carrying 10' - such as with this step, and if children can actually see the question, then it is also productive to expect children to solve it mentally by going down the columns. This is also true now for many of the next steps here where the same conditions apply.

This is not in contradiction to the progression of mental methods we are continuing with in CLIC because this method will not equip us for success in many other addition situations. However, it is common sense to acknowledge that we have the ability to quickly just say the answer without needing to write it down.

Step 6

I can solve any 3d + 3d



This step should be a mere formality since the learner has just mastered 3d + 3d on Step 5 and will already have encountered 'crossing 10' into the hundreds column at Step 4. So, there is very little new learning here. However, it is still worth 'ticking off' that the pupil has attained it.

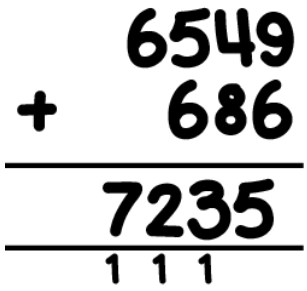
This step should finish with questions where the hundreds digits total more than 9, requiring the first use of the thousands column.

The understanding foundations for this step are found in 'Basic Skills: Addition: Step 29'. However, as before, learners will not necessarily need to visit this.

Again, it is also useful to extend this step into the addition of two amounts of money (e.g. £8.75 + £5.49), the understanding foundations for this are found in 'Basic Skills: Addition: Step 31'.

Step 7

I can solve any 4d + 2d / 3d

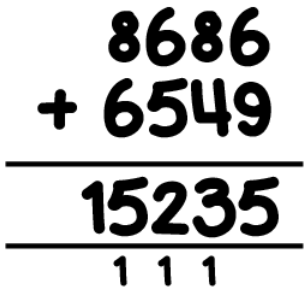


This step is really a small stepping stone towards Step 8. It introduces a 4d number for the first time. To begin with, add a 2d number, then a 3d number.

It makes sense to take each of these mini-steps and begin by not 'crossing 10' and then by increasing the frequency of 'crossing 10'.

Step 8

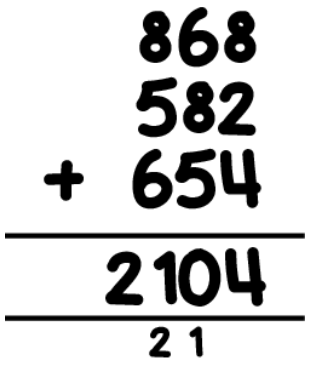
I can solve any 4d + 4d



This step is an extension of Step 7. A natural progression of mini-steps would be to start with questions where there is no carrying of a ten, then where one column requires this, then 2 columns, then 3 and finishing with all 4 columns. However, since all learners will be proficient with carrying 10 at this point, it may also be justifiable with some pupils to jump straight to the most challenging 4d + 4d questions.

Step 9

I can use Column Addition for several numbers



Before starting on this step it is useful to check that the pupil can add 3 single digit numbers together mentally with increasing amounts of challenge. If successful, try 4 single digit numbers.

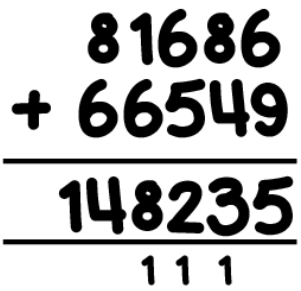
This is a pre-requisite skill for success at this step and has not been covered previously on the Column Method Progress Drive (however it is an extension of an earlier high-understanding step: 'Basic Skills: Addition: Step 20').

The key teaching point here is to provide questions where the numbers are not presented in columns and children are required to set up the question. The emphasis is then placed on setting up the question by aligning the units digits in a straight line and keeping the other respective digits in their correct columns also. Since this is a skill in itself, it is profitable to assess this 'setting up of the question' in isolation and reward success before moving on to asking the learner to go down the columns as before.

Obviously, it is useful to build up, beginning with the addition of 3 different numbers (without crossing 10 and then with), before moving on to 4 different numbers and so on.

Step 10

I can solve any 5d + 5d

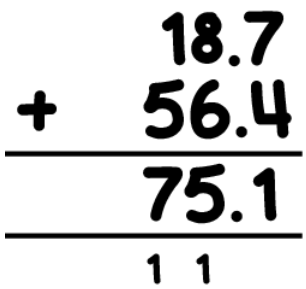


This step is an extension of Step 8, except now we gradually move into larger numbers. Lines of mini-step progression would be followed using the same principles already described.

This step finishes with 6d answers, therefore, it is important that learners are already familiar with and can already read and write 6d numbers (from the appropriate part of 'Basic Skills: Reading Numbers: Step 7').

Step 11

I can add numbers with 1dp



The understanding foundations for this step are found in 'Basic Skills: Addition: Step 34 and Basic Skills: Addition: Step 35'. It is worth going back and revisiting this high understanding method before linking it into the high doing of going down columns in this step.

However, prior to this even, pupils should have acquired the ability to mentally add two 1dp numbers. This is first taught in 'INN: Addition and Subtraction: Step 4' and then extended further in 'Basic Skills: Addition: Step 32 and Basic Skills: Addition: Step 33'.

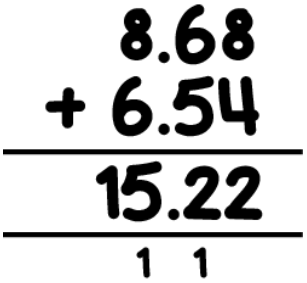
As long as all of this prior learning has been secured, it will be easy to blend the understanding of tenths with the skills of adding down columns, leading to more easy success.

Of course the size of the whole number ahead of the tenths can gradually be increased. So, starting with 1d.1dp + 1d. 1dp (4.3 + 5.7) progressing to 2d.1dp + 2d.1dp (44.3 + 35.7) etc.

It is also useful here to provide children with questions with numbers that are not presented in columns so that they have to align their own tenths columns and decimal points up themselves. This adds an important layer of understanding that we wouldn't want any individual to miss.

Step 12

I can add numbers with 2dp



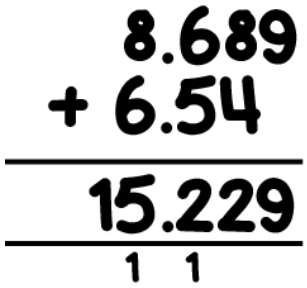
The understanding foundations for this step are found in 'Basic Skills: Addition: Step 36 and Basic Skills: Addition: Step 37'. However, a more useful 'door in' is to go back to Step 6 of this Column Addition Progress Drive and use the addition of money skill. By removing the pound signs (i.e. swap 'the thing' from pounds to just 'units'), we make the point that the skill is identical, whilst stressing the understanding behind the tenths and hundredths columns (which children are already familiar with from their CLIC journey). Hence £8.75 + £5.49 becomes 8.75 + 5.49.

It is again useful here to provide children with questions with numbers that are not presented in columns so that they have to align the tenths column, hundredths column and decimal point themselves.

Again the size of the whole number ahead of the tenths and hundredths can be increased gradually.

Step 13

I can add numbers with 3dp



In terms of technique, this is a small and easy step forward from the previous step, as we now introduce a third decimal column. Setting up the question and going down the columns using the same procedures provides little extra challenge.

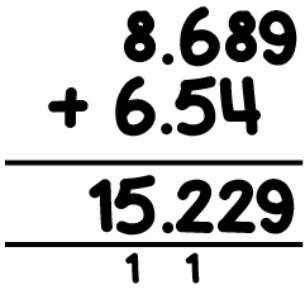
Again, this illustrates how crucial it is that children have a good understanding of what they are doing. By this stage, the concept of thousandths, the thousandths column, and the ability to read and write 3dp numbers, will have been secured from the earlier CLIC journey.

Extending this learning into measures is a useful progression and similar to the move to money that we made from the addition of 3d numbers at Step 5. For example 3.629 + 7.231 can easily become 3.629 Kg + 7.231 Kg and again, children will understand this if they have been brought up with Swapping the Units from CLIC.

Once this is successful, placing these questions into real life scenarios (Wider Maths) is also a very important part of the journey.

Step 14

I can add numbers with mixed amounts of decimal places



The understanding foundations for this step are found in 'Basic Skills: Addition: Step 40 and Basic Skills: Addition: Step 41'.

Initially, it is useful to provide questions where the numbers to be added are already in the correct columns (a 2dp number being added to a 1dp number). This provides a visual image of the issue that there are different amounts of decimal places. Initially learners can be asked to write in a zero where there is no hundredths digit on the 1dp number. After a few questions like this, the need to write in the zero will diminish as the child understands that technically it is there.

We can then take a line of progression where we build up the varying amounts of:

- decimal places (e.g. 3dp + 1dp),
- whole number digits (e.g. 2d.1dp + 1d.2dp),
- numbers being added (e.g. 1d.2dp + 1d.3dp + 2d.1dp).

Another line of progression is to provide questions where the numbers are not presented in columns and children are required to set up the question (as with Step 9). The emphasis is then placed on setting up the question by aligning the units digits in a straight line (or by using the decimal point as an anchor) and keeping the other respective digits in their correct columns also. As this is a skill in itself, it is profitable to assess this 'setting up of the question' in isolation and reward success before moving on to asking the learner to go down the columns as before.

Again, it is important to extend all of this learning into the context of measures.