Getting a hand on double digits

Children should be fluent with bonds of 10 and adding 10 to a number

Mike Askew is a Professor at Wits University. He is the author of several books for primary maths teachers and parents. In this article we share some ideas that Mike presented at a workshop for Foundation Phase teachers in Johannesburg.

Foundation-phase teaching

Mike proposed that the two things he would like to see children completely fluent with early in the Foundation Phase were:

- Bonds to 10; and
- Adding 10 to a number.

He argued that these skills were crucial building blocks for number sense and that they should be practised every day. He demonstrated the way he would do this in a class, using workshop participants as guinea pigs.

How it works

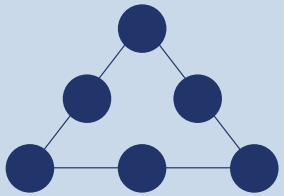
First, he wrote the numbers 53, 17, 72, 81 and 49 on the board. Then he got participants to partner with the person next to them. One person in each pair chose one of the numbers from the board to start with and then the pair, taking turns, counted up from that number in 10s. Everyone managed it successfully. He then got them to repeat the exercise, but this time had them counting up in 10s while clapping their hands, then clapping hands with their partner.

There was much hilarity as many of them made an occasional stumble or stutter as they tried to co-ordinate the two. When he added the final component — one partner getting to control the pace of counting in 10s by either speeding up or slowing down the clapping — there was even more laughter.

Wits Maths Circle Problem set 3:

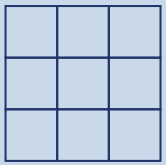
1. Using each of the digits 1, 2, 3, 4, 5, 6 once only, fill in the circles so that the sum of the digits along each of the three sides of the triangle is the same.

Is there more than one way of doing this?



2. Using each of the digits 1, 2, 3, 4, 5, 6, 7, 8, 9 once only, fill in the small squares so that the sum of each row, column and diagonal of the larger square is the same.

Is there more than one way of doing this?



The purpose

Askew said that this simple (and fun) activity had a number of purposes. The regular practice of counting up in 10s (starting at any number) was important for getting learners entirely fluent in adding 10 to a number. Once children were fairly comfortable doing the counting up in 10s, he added the clapping and the speeding up and slowing down to internalise the counting and make it "automatic".

He argued that no one could coordinate the clapping and counting if they had to think about or work out the next number. Also, the fun element of the activity enabled learners to laugh about their mistakes and created a classroom environment in which mistakes were not shameful, but part of learning.

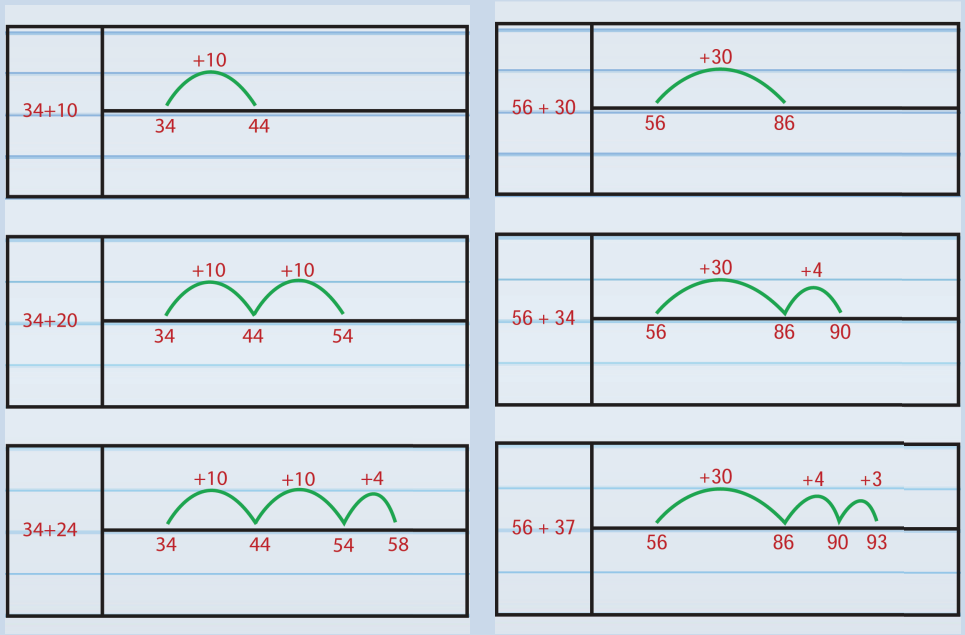
If learners are completely fluent in counting in 10s and their bonds to 10, then Askew's next set of suggested activities enables learners to add two two-digit numbers easily. 'He suggests that learners should be given calculation strings like: 34 + 10, 34 + 20, 34 + 23 as a set, and asked to say the answers to the first two as a way of building up to the answer to the third problem.

There are more examples of calculation strings, using number lines to show the jumping in tens, on the next page.

Internalising mathematics: Examples of calculation strings

Below are two typical calculation strings, along with what we would want the learner to write on the empty number line to represent them:

With practice, children learn to group the multiple 10s together into one jump, building efficiency, as shown below. They can also break down units to work through 10s, rather than having to add in ones — as shown below:



In these calculation strings, the first number is kept whole and the second number is split up. To do 56+37, we calculate 56+30+4+3. In schools it is common to teach learners to split both numbers up into 10s and units (50+6+30+4). Mike Askew said that keeping the first number whole provided a better strategy for mental calculations, as it extended easily to subtraction. For example, 54–36 is easy to do as 54–30=24 and then 24–6=20-2=18. But if we split both numbers, we get 50+4–(30+6) and children get confused over whether this is 50–30+4+6 or 50–30 and 4–6, or others.

Practice makes perfect

Askew said he had observed over and over again that, if learners were given enough of these calculation strings to practise regularly, the ideas became automatic. A learner faced with calculating 35+24 would be able to calculate first 35+20=55 and then 55+4=59 in their heads to reach the answer. Faced with 27+25, they would be able to do 27+20=47 and then see 47+5 as 47+3(+2)=50+2=52. After Askew took participants in the workshop through a number of calculation strings, he gave them some to do mentally.

He asked them to calculate 64 + 28 in their heads and to show a thumbs up near their chest as soon as they had the answer. This is a nice way for a teacher to get an idea of how everyone is doing without the fastest distracting or discouraging the others. In the workshop of more than 30 teachers, one of the fastest mental calculators was one of the teachers' 11-year-old daughter.