

# Vignette 6 – Place Value: expand and nest

## SUMMARY KEYWORDS

numbers, nesting, expansion, expanded, important, teachers, students, area, expander, hundreds, breaking, familiar, vignette, encourage, index notation, equipment, partitioning, notation, part, children

## SPEAKERS

Rob Proffitt-White and Robyn McNeill

We're now going to focus in on vignette six around the area of expanding and nesting. So we just shift a little bit down to these areas here. You can see name and expanding comprises of breaking the numbers into its component parts. And then nesting that's referred to in the New Zealand curriculum in levels two, three and four, is the idea of getting kids to sort of like break the numbers apart to really consolidate their conceptual understanding of numbers. If we just look first of all at expansion, which is actually a form of partitioning, and in other books, it's also decomposing, I think we will refer to these words because teachers in our experience, use a lot of different books and resources. And sometimes the semantics of all the different variations that we use for renaming, regrouping, partitioning, decomposing, it's important to know show you how these all come together. The first part of expansion, using an additive model is where kids are familiar with giving a 2,3,4 digit number, and then breaking it down. So 325 is three hundreds plus 20 plus five, this is probably a familiar component of place value expansion that a lot of students and teachers are familiar with. One thing we will get you to pay attention to is making sure that numbers we use have a zero in it. Because quite often, when students are assessed around this area, a question they come across will have a zero. And that's where many of the misconceptions can happen. We would encourage you to make sure children explore expansion using zeros internally within that number. The second part is expanded notation. And as we're focusing on that level three and four area, this then builds that bridge to index notation further up. So here, the same numbers, we can see that 325 is three lots of 100, two lots of 10, and five lots of one, and (1045 is) one lot of 1000, four lots of 10, and five lots of one. And so our third point here is we also encourage you to do it the other way around, because you want to go forwards and backwards, it's not always given the students a number and then expand, give them an expansion and make them go back to the number, because doing it both ways, will encourage a more rigorous depth of understanding with these. An activity that we've created with our teachers over the past few months is just one where a sheet of numbers is given to the students. And students are asked to highlight or ring certain numbers, and then get their partner to see if they can complete the number with what's there. And then obviously use their mathematical reasoning to discuss and defend these. So again, some little notes underneath here, you can either do it just for expanded form, or you can move them into expanded notation as well. You can also extend and enable these tasks, because if you want to extend them, you can push them, make sure they go into the parts of one, like the 10ths and the hundredths of thousandths. And if you want to enable them to get some students to actually start with yourself as a teacher for five minutes, you might just start them on just three or four digit numbers. And as we've said in previous vignettes, Robyn and I

made it quite clear that in level three, four, and even in years nine and 10, it's essential that kids can often get short term success with numbers that they are familiar with. And then you can steadily move them through that.

If we think about nesting, and what it is, nesting is about, the idea that there are ten tens nested inside 100. And it's really important to play with that idea. A way of doing that and supporting children with that as the scaffold called a number expander which are really easy to make. You could make these and laminate them and then just leave the digit area blank and just use a white board pen to write different numbers so that children get to have this experience. If we have a look at this number 29,503. If we were to expand that using our number expander. We would say that there are two ten thousands and 950 tens and three ones or we could expand it differently. Keep some of them closed and you would say that there are 29 thousand, and 503 ones. And another one, again is that there are 295 hundreds, and three ones, so many ways of using this resource to support children and seeing that. And I would also suggest that actually you get the place value equipment out again, get them to make this alongside the scaffold. They're not only reading it, they're not only identifying the nests within this large number, they're also seeing how that relates to the equipment. So we're again coming back to that triangle of see, say, do, really important to make those connections because language is a really big part of place value.

Robyn, would also be that nesting can also be a case of like taking 1000 could also be 10 hundreds?

That's right, so it's really important to unpack that idea and equipment is a really great way to see those ideas of nesting.

That goes through the expanding and nesting and in our next vignette, we'll take that one step further to look at how we can sort of rename the different numbers.