Leaders in Mathematical Thinking
Alex Lawson - Building Math Strategies

>> I was making the argument that when children are learning their facts, that there is a huge amount of mathematical territory between the initial things that they might do, so direct modelling. So if I were counting -- if I were going to use a calculation five plus seven, and I were learning that as a young child in grade one, I might count out five, I might count out seven, and then count from one again. That would have been the first strategy I would have learned. Then in some classes, and certainly when I went to school, then I would have learnt it as a math fact. I would have memorized it. Those were the two things I would have learned about five plus seven, and nothing else. But, in fact, there's a lot of math territory in between beginning five plus seven concrete modelling, and finally knowing it as a fact. And that territory is foundational to junior, intermediate, high school match. It's foundational to being fluent in everyday living, and being able to be a mathematician outside of the classroom. So the takeaway from today was that that territory is fruitful, and we need to work through that territory before memorizing the fact, if, indeed, we need it at that point. But over the last ten years, I would say there has been a shift in a lot of classrooms to children using different strategies in order to solve five plus seven. So they might do five, and then count on -- six, seven, eight, nine, ten, eleven, twelve, to solve that calculation. And that has been the shift in the classroom. But the message I think that's out there in some parts of the population is that that strategy, amongst many, are all equal, where, in fact, there is a progression. They don't have to do all of the strategies, but there is a progression from pretty inefficient to very efficient strategies that children should learn. And so teachers are trying out having kids using different strategies. But we want to hone that a little bit more and think about, what is the progression? And not only what is the progression, but which strategies are going to have legs? And so by "legs," I mean mathematical legs are those strategies that have mathematical legs, or those ones where they are going to be able to use them. They can generalize it into many situations. And they'll use them later with double-digit addition, for example. And the big ideas, or the key ideas that underpin this, the mathematics that underpins some of those strategies lays a foundation for later mathematics. They're beginning to develop these ideas that underpin algebra; they're going to come up later, and many more than that. I'm just making the case with addition, but I could deal with subtraction in a more sophisticated way; multiplication and division. They are learning real mathematics. And it's their mathematics. They are constructing it with support of good teaching. And so they own it. You know? They can use it in other situations, because it is their mathematics, and they own it. So I made the case with addition, because I'm working with one, two teachers right now. But I could make the same case with multiplication and make it much more strongly. So again, if the only way a child learns any multiplication fact -- let's say six times seven -- if the only way they learn that is, first they do six groups of seven and count by ones, very first strategy they'll probably use, and count up to 42 -- pretty laborious, and then they memorize it, then there's a huge amount of mathematics they miss out on that they could be developing. And it will be, I think, for many kids. It's unfortunate for

them, because they don't have that opportunity. And then algebra is much more difficult for them than it needs to be later on.