

Vignette 1 - planning

SUMMARY KEYWORDS

proficiencies, solving, maths, disposition, vignettes, curriculum, students, procedural fluency, reasoning, problem, areas, procedures, procedural, conceptual understanding, evidence, understand, communicate, adaptive, key, unfamiliar

PRESENTER

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Kia ora, this is the Just in Time Maths vignette series, there are a series of 10 vignettes that cover some of the key areas that kaiako, who were part of the Just in Time project requested were made into short, sharp, five to 10 minute vignettes that they could share at their schools. The first is looking at curriculum intent. We have five maths proficiencies that form a foundation of curriculums around the world. And these are widely accepted definitions. In the recent Royal Society expert advisory panel on maths and stats, recommendation eight communicates that these five proficiencies are a key focus for helping promote a stronger insight into maths in terms of teacher knowledge, and identifying strengths in students. Proficiency strands identify the maths learner within communities of practice and beyond. And we're at the core of Anthony and Walshaw's Best Evidence Synthesis for all the content areas. These five proficiencies help students understand how and why behind it.

One way of thinking of it could be the content skills are the nouns of the curriculum, and the proficiency strands are the verbs. The New Zealand maths and stats curriculum has a key list of ideas, processes, and dispositions. And these naturally relate to those five proficiencies. We have procedural fluency, and conceptual standing, and problem solving, and adaptive reasoning, and intertwining all of these is productive disposition. If we look at two simple procedural skills here, addition of fractions and number facts, students who have conceptual understanding can often build connections and representations drawing pictures, using number lines, using procedures to help make something unfamiliar familiar. With number facts, they're able to represent them as arrays, as a social situation, and also derive new facts. If they know 8×7 is 56. They can learn from that point eight times seven, 800 times 7, 56 divided by eight. A quick example here is students given a question like this to estimate and explain those with just procedural fluency often withdraw from doing it, they may forget a procedure, they may get it right. But they've taken a long way round to get there and may not actually value and understand what estimate means. Those with conceptual understanding alongside procedural fluency, know it's not right, without even calculating, they can apply rounding and see it's 10 times eight, and then understand that maybe the digits are right, but they're in the wrong order with the decimal.

We see that maths consists of skills, processes and dispositions and NZMaths houses the elaborations, which take kaiako behind all of the achievement objective, and help us understand this. We want to be familiar with both achievement objectives and/or phases of learning, and which of those we use all

comes down to a deep understanding of what these actually mean, I would recommend that the elaborations and key ideas on the NZ Maths page are brought to life for you and your school, because it's a really powerful way of us as kaiako and our ākonga to see what lies behind all the math concepts. Here's an example of looking at level three. What we can do, we can see instant ways to adapt tasks even create our own tasks, we can actually start to look for more existing resources, more focused. We can communicate clear learning outcomes, and we can also look for evidence as we monitor ākonga in our classroom.

Now to look at problem solving and reasoning. Problem solving is a range of meaningful contexts, students will be engaged in thinking mathematically and statistically, they'll solve problems and model situations. Problem solving is not just a case of having 20 very quick sums to do; 10 plus five, eight plus three. It's looking at more what problem solving is. There needs to be evidence of exploring and explaining and proving and justifying. In terms of solving problems they need to be authentic and rich. They need to be looking at open ways of solving and unfamiliar and turning maths situations into symbols and representations that ākonga can understand. This is our problem solving and reasoning area. And finally, adaptive reasoning, well we need three conditions to support it, because this is the glue that holds everything together. And we have identified with kaiako that many of ākonga can be below level in terms of procedural fluency, but at level in adaptive reasoning, and often they are not allowed to show their strengths. Because in some cases, ability or streaming can push these kids to just repeat procedures, which causes frustration and boredom. So we need to make sure that these five proficiencies are available to all students.

The final point is around productive disposition which leads us back to the big ideas of the New Zealand curriculum. Our values and competencies, the principles the effective pedagogy are all part of productive disposition. In conclusion, we need to be familiar with these proficiencies and use them ourselves to see our own strengths and weaknesses and where lies opportunities to improve and also communicate them for our ākonga. Another way that kaiako are finding these is in a typical week, having a mental check and reflection of 'have I accessed all these areas this week?', 'have I allowed opportunities and experiences to happen for ākonga in all these areas?'. As we go through the other vignettes, you' will journey through examples and relate them to these proficiencies. We want you to feel confident and empowered with how the proficiencies look and what you can do to ensure equitable and inclusive access to them.