

The impact of the mathematics framework at Lynmore School.

About us

We are a large primary school in Rotorua catering for students from year 0 to year 6. We value aroha, integrity, courage, and curiosity. We think students learn best when they have the courage to take risks to learn about things they are curious about, and this philosophy underpins how students learn across the curriculum in all areas. We've been using the mathematics framework for four years now. Here's our story about why we began using the framework, how we got started, and the impact it has had on our teaching and learning.

Why we began using the mathematics framework

We started looking into the framework because we had concerns about the emphasis we had placed on number after the Numeracy Project. Number had become the be-all and end-all, and students who did well in aspects of mathematics other than number didn't have the opportunity to shine. We were teaching all the strands of the curriculum, but our approach was siloed. Students weren't able to apply their number knowledge when operating in other areas of mathematics, such as measurement.

How we got started

It was important to explore the framework together as a whole staff. We all needed to be involved, so that we were all using the same terminology. All teachers and all students participated. We started with the mathematics framework because we felt it was more straightforward than reading or writing, so it would be best to familiarise ourselves with the tool in this area.

Initially, we needed to understand how the framework was structured. We started with geometry, as it has the fewest signposts, and tried to order the big ideas behind each of the sets of illustrations. We quickly realised we didn't have a

good mental model of how geometric concepts build, and this got us thinking about other areas of mathematics. Did we have a clear understanding of how multiplicative thinking builds, for example? We really didn't. We decided the way forward was to build this understanding of how skills and knowledge develop from signpost to signpost. What is the difference between this signpost and the next one? What skills and knowledge do students need to move from one to the next? Understanding how each of the signposts and aspects builds was key because we needed to have a good mental model of the framework.

As we built our understanding of the framework, we found gaps in our curriculum knowledge. Teachers started saying things like "Wow, I didn't know I was supposed to teach that" and "I've never taught that in my life before". The required level of sophistication in student knowledge and thinking was also a revelation for some teachers. We needed to develop a culture where it was OK to admit there were gaps in our knowledge. It was nobody's fault, it was just that we hadn't had a framework before that clearly showed how mathematical skills and knowledge develop.

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Using the framework for planning rich programmes

Once we started developing mental models of how mathematical skills and knowledge build, it was really important that teachers started to think about the framework as a planning tool. We quickly realised that it wasn't realistic to systematically and independently teach every

progression, because there are too many. If we tried to do this we'd be spending all our time teaching reading, writing, and mathematics with no time for anything else.

We started looking at curriculum design, our local curriculum, and the rich tasks we were using. Teachers started with science or whatever learning area they were working in, and thought about how they could address different progressions of the framework in rich learning tasks which provided multiple opportunities for students. Rich tasks also needed to cater for learners at different signposts within each progression. Curriculum design and planning became the driver, and it was really important to do it well. Teachers worked in syndicates to plan, with everybody in the school focused on the overarching or universal concepts.

We realised that we needed to stay connected to the important ideas of mathematics by being specific about the progressions and signposts we're focusing on when designing rich tasks. The mathematics framework gave us the security that we weren't missing anything. As long as we were linking everything back to the signposts of the framework, we knew we were on safe ground in terms of the curriculum.

Our planning is also directly influenced by the maths profiles we have built up over four years for every student. We now write an IEP (individual education plan) for every child because it is easy to do it. It sounds massive to say that, but every child deserves an IEP because every child is an individual. The framework has made that doable.

Focusing on teachers' knowledge

The impact of the mathematics framework on teachers' content knowledge has been huge. Until teachers understand something themselves they really can't teach it, so as a school we have run PLD about how to do the mathematics, not just about how to teach the mathematics. We've found the framework really helpful, because it has provided a safe and non-threatening way to improve content knowledge. The focus on student tasks has made the mathematics accessible for teachers.

We find our teachers having quite complex pedagogical discussions in their teams now. For example, they might be talking about the

difference between the fifth and sixth signposts of the multiplicative thinking progression, and how those differences might be demonstrated.

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How the framework has impacted on our students' achievement

We've been using the framework for four years now, and over those years we've seen significant shifts in student achievement and significant shifts in student agency. One important thing we've learnt is that it's not a quick fix; the mathematics framework is a tool you need to use long-term. It's been important for us to take time to develop a good mental model of the framework so we know how mathematical skills and knowledge build, and to develop teachers' content knowledge where needed. It's also taken us time to establish how we can most effectively use the framework in our planning.

Now that we've embedded the framework into our practice, our mathematics achievement is the best it's ever been. We regularly enter and win our local mathematics competition, so this year we decided to take a team of students to the regional competition to see how they'd go. They performed very well, and capably solved the wide variety of mathematics problems they were presented with, drawing on their broad skills and knowledge. To our surprise they won the competition, and on reflection, we credit their success to the mathematics framework.