THE MATHEMATICAL ASSOCIATION OF VICTORIA

THE COMMON DENOMINATOR 2/26

POWERFUL MODELLING TASKS

INSIDE

Andrew McKibbin, Learning Specialist, Murrumbeena Primary School

FROM PROFESSIONAL LEARNING TO CLASSROOM PRACTICE: DESIGNING POWERFUL MATHEMATICAL MODELLING TASKS

In 2025, Murrumbeena Primary School embarked on an exciting journey to implement a whole-school approach to the Victorian Curriculum 2.0 Mathematics focus on mathematical modelling. Throughout this process, our community embraced modelling as a powerful tool for making sense of real-world situations, enabling students to use mathematics to explore, predict, justify and solve meaningful problems. As an International Baccalaureate (IB) World School, Murrumbeena Primary School is deeply committed to creating authentic learning experiences that empower students to apply their understanding to real-world contexts and solve genuine problems.

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THE COMMON DENOMINATOR
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The Mathematical Association of Victoria, 61 Blyth Street, Brunswick VIC 3056

ABN: 34 004 892 755
Tel: 03 9380 2399
office@mav.vic.edu.au

President: Kerryn Sandford
CEO: Jennifer Bowden

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FROM THE PRESIDENT

Kerryn Sandford

As I write this final column, I find myself reflecting on a recent opportunity to visit a local primary school and observe mathematics teaching in action. Stepping into a different sector is always both affirming and stretching. There is something powerful about seeing familiar challenges approached in new way; about noticing the subtle shifts in language, task design, and classroom culture that can make such a difference to student learning. It served as a timely reminder that some of our best professional learning does not come from looking outward for the next new initiative, but from looking sideways into each other's classrooms, across schools, and importantly, across the primary/secondary divide.

Too often, however, we know the value of this kind of collaboration without being able to realise it. The practical constraints are real. Releasing staff to visit other schools is difficult, and even when time can be found, knowing where to go and what we might be looking for can be a challenge in itself. This is where our professional community matters deeply. One of the great strengths of the Mathematical Association of Victoria is its unique vantage point across the system.

Through their work in schools across the state, MAV staff are well placed to connect educators, share practice, and help bridge the gaps that can exist between contexts. There is more we can continue to do here, and I remain hopeful about the role MAV can play in strengthening these connections.

I would also like to take this opportunity to remind members of our upcoming AGM, where I will be stepping down as President. It has been a privilege to serve in this role, and I am deeply grateful for the support, wisdom, and generosity of those I have worked alongside. My sincere thanks go especially to Jennifer Bowden, our CEO, to the MAV staff, whose commitment and expertise underpin everything we do, and to the Board, whose members so willingly give their time and energy to sustain and grow this important work.

Finally, thank you to our broader MAV community. You are the reason this organisation remains such a vibrant and impactful presence in mathematics education. I have learned a great deal from you through conversations, collaborations, and shared purpose.

As I step aside, I would warmly encourage others to consider contributing to the work of MAV, including through the Board. It is rich professional learning and a meaningful way to give back to a community that supports us all.

Thank you for the opportunity to serve.

MMC: BOOK NOW

Join us at the Melbourne Mathematics Conference on Wednesday 3 and Thursday 4 June 2026, where we'll explore the inspiring theme *Elevating Mathematics Education: Connecting Theory and Practice*.

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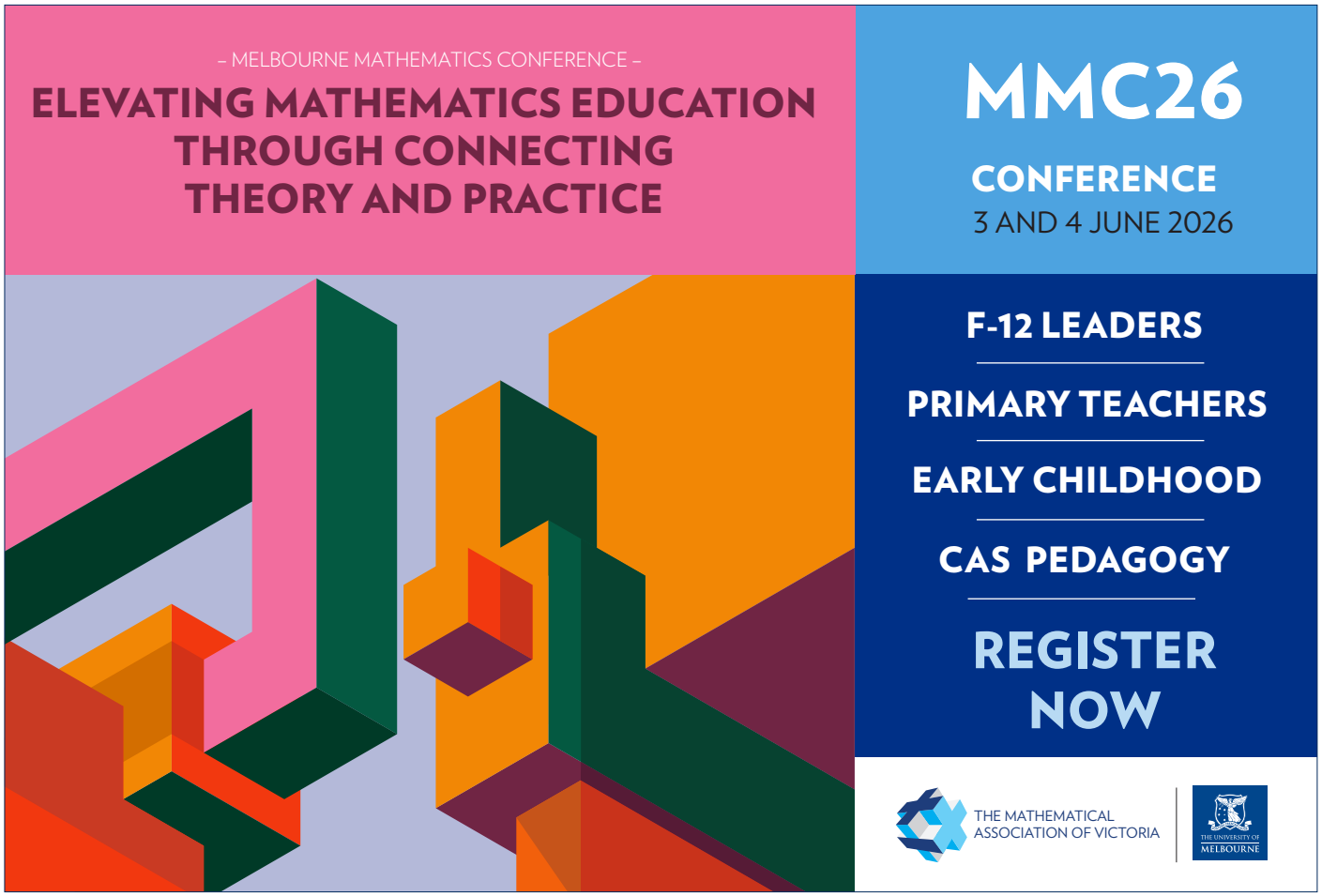
UPCOMING MAV EVENTS

For more information and to reserve your place at any of the events below, visit www.mav.vic.edu.au.

EVENT	DATE	YEARS	PRESENTERS
Patterning and symmetry in play	28/4/26 (Virtual)	EC	Dr Jo Grimmond
Getting started with Maths in Schools: Free tools and courses	5/5/26 (Virtual)	F–6	Maths in Schools
How to become a maths active school and/or a maths active educator	7/5/26 (Virtual)	F–12	Renee Ladner
Bringing data to life: How to tell powerful stories with evidence	12/5/26 (Virtual)	F–12	Dr Selena Fisk
Spatialising early numeracy: Setting the foundations for reasoning about number in the early years	14/5/26 (Virtual)	EC	Dr Chelsea Cutting
Connecting culture with mathematics	20/5/26 (Virtual)	F–12	Dr Caty Morris
From play to understanding: Cuisenaire Rods in action	21/5/26 (Virtual)	F–6	Antonio Sterich
Melbourne mathematics conference: Elevating mathematics education through connecting theory and practice	3/6/26 4/6/26	All	Various
MAV annual conference: Activating mathematical hearts, hands and minds	3/12/26 4/12/26	All	Various



POWERFUL MODELLING TASKS

Andrew McKibbin, Learning Specialist, Murrumbeena Primary School

CONT. FROM PAGE 1.

Figure 1. Mathematical modelling in the garden.

Embedding mathematical modelling into our mathematics program was a core focus.

Our journey began with professional learning led by Di Liddell from MAV. Through a series of engaging, hands-on activities, Di supported staff to deepen their understanding of mathematical modelling and how it differs from traditional problem solving. While both processes require reasoning, creativity and persistence, Di highlighted that modelling tasks are grounded firmly in authentic contexts – situations that students could realistically encounter in their everyday lives and that have a meaningful purpose associated with them.

Through our professional learning we explored a range of mathematical modelling cycles, including frameworks developed by Resolve, ACARA and Dr Jill Brown.

Through professional dialogue, teachers examined the similarities and differences across these models, identifying key overlapping features: beginning with a real-world problem, formulating to gather information and represent the problem mathematically, solving to select and apply appropriate strategies, and interpreting to evaluate solutions within the original context.

We also examined the MAV Mathematical Modelling Task Design Checklist, using it to guide the planning of tasks and to ensure that our modelling experiences were purposeful, authentic and rich in mathematical thinking.

To deepen our understanding of mathematical modelling, teachers immersed themselves in a full modelling cycle, based on a bushwalking scenario. Working in year level teams, we began by posing a real-world problem, then formulating it by articulating assumptions, identifying key variables and defining parameters.

We generated and refined strategies, constructing provisional models to represent reasoning and testing the plausibility of our approaches. As the task unfolded, teachers quickly recognised that mathematical modelling rarely leads to a single definitive solution. Instead, it produces multiple valid models, each shaped by different assumptions, simplifications and interpretations of the context. This realisation not only brought the modelling process to life but also built deeper empathy for students as future modellers – strengthening teachers' confidence in facilitating open-ended, iterative and exploratory modelling experiences.

With this insight, teaching teams began designing modelling tasks tailored to their students. Many connected the tasks to upcoming end-of-year events or real-life planning, linked to units of inquiry. This created authentic opportunities for purposeful, relevant mathematical thinking.

Two standout examples came from the Year 3 and Year 4 teams, whose projects showcased rich, creative and rigorous student reasoning.

YEAR 3: DESIGNING FOR SUSTAINABILITY — REIMAGINING THE STEPHANIE ALEXANDER KITCHEN GARDEN

In Year 3, students engaged in a rich mathematical modelling task focused on redesigning the Stephanie Alexander Kitchen Garden space.

This project brought together mathematics, sustainability and design thinking, providing students with a highly authentic learning experience. The task began with a visit from a professional landscaper, who introduced students to blueprint designs and explained the garden design process from initial planning through to final construction.

Students learned how to measure garden spaces accurately and calculate the amount of soil required for planter boxes. They explored key measurement concepts, including length, width, area and volume, while also applying the four operations to manage budgets and quantities. Working in small groups, students created rough design drafts, carefully considering layout, plant placement and functionality.

A critical component of the task involved budgeting. Using a set financial limit, students researched material costs and used Excel spreadsheets to track their spending.

This required students to apply addition, subtraction, multiplication and division in a highly purposeful context, constantly revising their plans to remain within budget. Students soon discovered the importance of compromise and prioritisation – learning that creative ideas must often be balanced against practical constraints.

The final stage of the project saw students refine their designs into polished plans, which they proudly presented to the school. These presentations demonstrated not only strong mathematical understanding, but also communication skills, teamwork and problem-solving confidence. Through this modelling experience, students developed a deep appreciation for how mathematics informs real-world decision-making, reinforcing its relevance beyond the classroom.

YEAR 4: PLANNING THE PERFECT PARTY — MATHEMATICS MEETS CELEBRATION

In Year 4, students tackled a modelling task centred on planning their end-of-year class party.

This engaging context allowed students to apply a broad range of mathematical skills while collaborating toward a shared goal. The challenge required students to consider budgeting, operations, measurement, time management, estimation, data organisation and spatial reasoning – all within a lively and motivating scenario.

Students began by developing budgets for decorations, food and party supplies, using tables to track expenditure and ensure spending remained within limits. This process encouraged careful planning, financial literacy and strategic decision-making. They explored all four operations as they calculated food quantities, determined fair sharing and assessed whether available resources met the needs of the group. For example, students calculated how many sausage rolls each student would receive and how seating arrangements could be organised with a limited number of tables.

Spatial reasoning was developed through the task, as students calculated table layouts using concepts of area and perimeter. They designed seating plans that ensured sufficient space, comfort and accessibility. Time management also played a key role, with students creating detailed schedules to balance games, eating time, setup and pack-up. This fostered an understanding of sequencing, elapsed time and organisation – essential life skills supported through mathematical thinking.

Estimation and categorisation further enriched the task. Students predicted how much food would be required, sorted supplies into functional groups and evaluated which items would best suit their classmates' preferences. Throughout the process, students were encouraged to justify decisions, revise plans and reflect on their assumptions, embodying the iterative nature of mathematical modelling.

LOOKING AHEAD

Murrumbeena Primary School's first whole-school exploration of mathematical modelling has been both inspiring and transformative. Teachers have reported increased student engagement, deeper conceptual understanding, and stronger mathematical reasoning and confidence. Students, in turn, have embraced the opportunity to use mathematics meaningfully, discovering that numbers, measurements and calculations are powerful tools for participating in the world around them.

As we continue to embed modelling across our mathematics curriculum, we look forward to refining our practice, sharing insights and further empowering students as capable, creative and critical thinkers. Mathematical modelling has opened exciting new pathways for learning at Murrumbeena Primary School, and we are excited to see where this journey leads next.

LEARNING THAT LANDS

Emma Ross, The Maker Difference

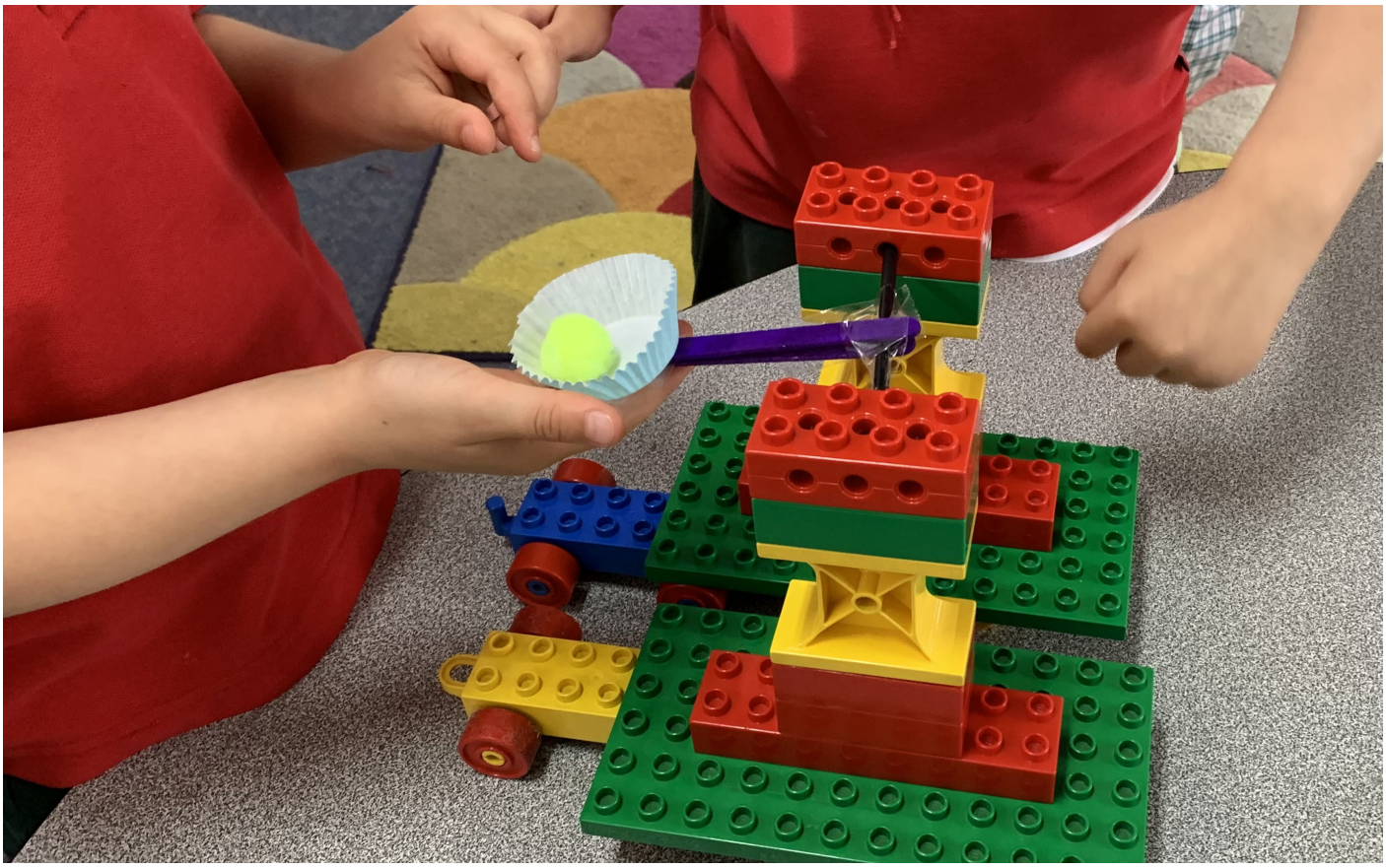


Figure 1. Scout built a catapult from Duplo. Launching the pom-pom sparked a rich discussion of measurement.

HANDS-ON STEM BUILDS DEEPER MATHEMATICAL UNDERSTANDING

Young children are naturally fascinated by movement. Whether they are watching a ball bounce, a swing soar, or a leaf drift to the ground, they are constantly observing how objects move and change. These everyday moments spark questions, wonder, and experimentation as children make sense of the world around them.

At the same time, children draw on informal mathematics to interpret what they notice; counting steps, estimating how far a toy might travel, or realising that pushing harder makes something go further. These early encounters reveal children's intuitive use of measurement, comparison, prediction, and spatial reasoning. Purposeful STEM learning experiences build on these curiosities, supporting children to explore mathematical concepts through hands-on investigation. These experiences provide the foundation for the classroom example and the teaching strategies highlighted in this article.

A CATAPULT INVESTIGATION

One rich and accessible way to explore these ideas is through catapult investigations. Simple catapult challenges can introduce children to fundamental scientific concepts - force, motion, and energy transfer, while also embedding authentic opportunities for measuring, counting, comparing, and problem-solving. As children build and test their designs, they explore how different materials, heights, and angles affect how far and high objects travel. This naturally brings mathematical thinking to the surface.

BEGIN BY CONNECTING WITH PRIOR KNOWLEDGE

Drawing on children's existing knowledge strengthens understanding and makes the learning meaningful. These connections can be informal conversations, shared images, or hands-on comparisons between familiar tools and catapult mechanisms. Examples:

The woomera: a traditional Aboriginal tool that uses leverage to launch spears further and faster. Like a catapult, it relies on stored energy, force, and mechanical advantage. Making this connection highlights First Nations engineering knowledge and invites respectful discussion of technologies grounded in deep scientific understanding.

Seesaws: which use the same lever mechanism: push on one side and the other rises.

Tennis ball launchers: common in sport contexts and excellent examples of lever or spring-loaded mechanisms.

Medieval catapults: historical models that show how levers and energy transfer were used in design and problem-solving.

A WINDOW INTO THE CLASSROOM

The following vignette illustrates how a STEM learning experience creates authentic opportunities for mathematical thinking in a Prep classroom.

As the children gathered around, Scout released her catapult and watched the pompom arc through the air. 'I think mine went further,' she announced.

'Maybe we could check by measuring with our hands?' the teacher suggested, modelling how to place one hand in front of the other and count aloud. ' It's seven. Would you like to try?' Scout repeated the process but counted nine.

'It's the same distance, so why are the numbers different?' the teacher wondered.

'Because your hands are bigger - it's not fair!' Digby exclaimed. Soon the children were comparing hand sizes, realising the need for a standard unit.

'Could we use pencils instead?' the teacher asked.

'No, they're different lengths.' Digby replied.

'What do we have in the classroom that is always the same size?' the teacher prompted. The children gathered scissors, glue sticks, and erasers, voting to use glue sticks as their standard measure. They rushed back to measure their catapult distances, record them on the whiteboard, and compare results. As they refined their designs and made new predictions, the room filled with excitement.

Watching her students, the teacher reflected: 'This is a beautiful example of knowledge transfer in action. The children drew on earlier experiences with measurement, applied them independently in a new context, and used mathematical reasoning to solve an authentic problem. Although I had introduced measurement concepts before and supported their use in familiar situations, today they applied that knowledge flexibly. They identified the need for standard units, debated options, selected a tool, measured accurately, and used the data to compare results – all driven by their own inquiry. '

She continued observing as the children recorded distances, discussed which numbers were larger or smaller, and used this information to make decisions about how to improve their catapults. The learning was collaborative, meaningful, and clearly student-led; an example of how hands-on STEM challenges can create natural opportunities for deep mathematical transfer.

WHY HANDS-ON STEM LEARNING EXPERIENCES SUPPORT DEEP MATHEMATICAL THINKING

Hands-on STEM learning - like the catapult investigation - gives children the space to lead with their curiosity. As they make, test, reflect, and try again, their mathematical thinking emerges naturally: they make predictions, compare outcomes, and build understanding together. These are not contrived moments, but genuine opportunities for children to use maths as a tool, grounded in real inquiry.

This approach aligns with Constructionism (Papert & Harel, 1991; Stager, 2005), which argues that building tangible, meaningful artefacts helps children develop conceptual understanding. Building things is not just about crafting; it's about thinking. When children make, they also reason, measure, estimate, and refine their ideas based on what they observe.

Contemporary research deepens this argument. Yelland's work on 'STEM Learning Ecologies' (Yelland, 2020) highlights that while content knowledge remains essential, it is strengthened when children engage in authentic investigations - experimenting, exploring, communicating, and making meaning across multiple modalities. When children move beyond simply following instructions and participate in dynamic interactions with peers, materials and ideas, their reasoning, problem solving, and critical thinking develop. The learning ecology itself prompts them to ask questions, test possibilities, negotiate, and document their learning (Yelland, 2020). This aligns closely with hands-on STEM experiences like the catapult investigation, where learning emerges naturally, teaching is intentional and children are supported to make smooth transitions into school while engaging meaningfully with mathematical ideas.

WHAT NOW?

For teachers looking to embed more authentic mathematics into hands-on STEM learning, small shifts can make a big difference. The goal is to design opportunities that allow students to build on secure foundational knowledge and then apply it creatively, at the point where

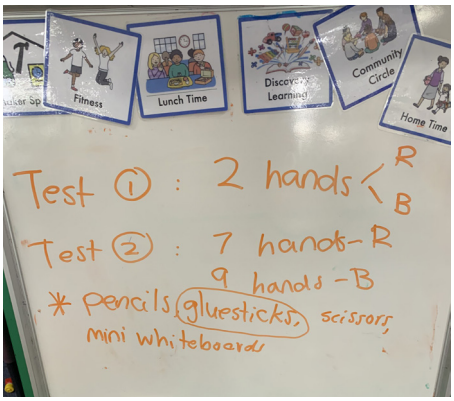


Figure 2. Testing the accuracy of different objects to measure distance.

their understanding is deep enough for rich reasoning and authentic problem-solving.

Plan experiences that introduce key mathematical ideas such as measurement, comparison, or recording data through clear modelling and guided practice. Provide opportunities for children to apply these skills in varied contexts – indoors, outdoors, and across different materials – so their understanding can deepen. Look for moments of adaptation, where students transfer their knowledge spontaneously to new challenges, just as the Prep students did when they recognised the need for a standard unit of measurement. Choose simple STEM investigations such as ramps, water exploration, ziplines, or construction projects, and let children's questions guide mathematical inquiry. Encourage predicting, measuring, refining, and recording as natural parts of the learning flow. When teachers design environments that support curiosity and provide rich tools for exploration, mathematics becomes meaningful, connected, and genuinely exciting.

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MAKE THE MOST OF PAST EXAMS

Fiona Latrobe and Danijela Draskovic

MAKE THE MOST OF PAST EXAMS IN VCE MATHEMATICS REVISION

As the VCE examination period approaches, a familiar question arises for teachers and students alike: how can revision time be used most effectively? Many VCE mathematics courses are completed before the end of Term 3, leaving a valuable revision window. This time can make a significant difference to student outcomes if it is used strategically.

An effective revision program usually combines independent student practice with structured classroom activities that guide students and keep them focused. One of the most powerful tools available during this period is the use of past examination papers. These give students authentic insight into the structure, language and expectations of the exam while also helping them consolidate their understanding of the course.

THEMED REVISION

Beyond full exam sittings, themed revision sessions can be extremely effective. These sessions often use past exam questions but focus on particular skills rather than simply revisiting topics.

Theme 1: Reading time

One useful theme focuses on how students use reading time. In this activity, students begin an exam under normal reading-time conditions while the teacher observes their strategies.

When reading time ends, the exam is paused and students reflect on what they actually did (and didn't) do, and how they can maximise the use of their reading time. A short discussion with the use of a questionnaire can help students identify more effective ways to use those valuable minutes.

Theme 2: Regular questions

Another theme involves what might be called 'regular questions'. Many VCE exams contain familiar styles of problems that appear year after year. These questions are often straightforward, but they represent valuable opportunities for students to secure marks quickly and confidently. Working through examples of these recurring questions helps students recognise patterns and build fluency.

Theme 3: Smart answers

A further focus is developing 'smart answers'. Students frequently lose marks by writing too much or too little. Exam command words such as state, calculate, show that and explain require different types of responses. Analysing past questions where marks were commonly lost can help students better understand the level of explanation required, as well as issues such as rounding and presenting answers clearly.

Theme 4: Focus topics

Teachers will also recognise topics where students historically struggle, or where their class has found particular challenges. As an example, in General Mathematics, these may include transformations, time series analysis, aspects of finance, transition matrices, and activity networks involving crashing. Targeted revision sessions using past exam questions on selected topics can help address these areas of difficulty within a particular cohort.

PRACTICAL STRATEGIES

After exploring revision through themes and targeted exam skills, it is also helpful to consider a few practical strategies that allow students to engage with a larger range of past exam material while keeping revision varied and purposeful.

Strategy: Timed exam practice

A key part of effective revision is ensuring that students experience the examination environment itself. Sitting at least one of each Exam 1 and Exam 2 under proper exam conditions, including reading time, is essential. Many students underestimate how demanding it can be to maintain focus for the full duration of an exam – particularly Exam 2, which runs for one hour and forty-five minutes.

Maintaining this discipline at home can be difficult, so it is valuable for teachers to run practice exams in a supervised setting using the official VCAA formula and answer sheets. Ideally, teachers might schedule two such exams: one at the beginning of the revision period and another closer to the end. The difference in results can clearly demonstrate the progress students have made over the revision period.

Beyond these structured trial exams, students benefit enormously from completing additional past exam papers once the course has been finished. The goal is not only familiarity with the mathematics itself, but also familiarity with the rhythm and pressure of the examination. When students repeatedly work within the same time limits and structures, the exam becomes less intimidating and their confidence grows.

Strategy: Varying format and maintaining engagement

Revision can become repetitive if every session involves simply completing exam questions. Varying the format helps maintain engagement while still building exam skills. For example, when revising time series descriptions in General Mathematics, presenting a series of graphs in a Kahoot activity can be both efficient and enjoyable. Students might have all descriptors from the study design available but must select only those that apply to each graph.

Strategy: Paired verbal walkthroughs

Full exam sittings take time, and the revision period is often shorter than we would like. One efficient strategy to cover more practice exams is to have pairs of students talk through an exam together without writing full solutions.

Paired students with similar ability levels take turns explaining how they would approach each question, discussing possible strategies, technology use and potential challenges. This verbal walkthrough allows students to engage with an entire exam quickly while hearing alternative approaches from their peers.

PAST EXAMS AND OTHER RESOURCES

It is also worth remembering that past exam papers vary in style and difficulty. VCAA exams are, of course, an essential resource, but teachers may also draw on other high-quality sources such as MAV trial exams and papers produced by other jurisdictions. Exposure to a range of exam styles helps students become more adaptable and better prepared for unfamiliar questions.

Alongside exam papers, a range of structured revision resources can further support students during the lead-up to the exams.

MAV VCE REVISION PROGRAM

One example is the MAV VCE Revision Program, an online, on-demand resource available to students from the beginning of Term 2. The program includes extensive video explanations by subject matter experts who unpack past exam questions and explore sections of the course where students commonly experience difficulty or misunderstanding.

The material is organised by topic and includes hours of detailed video content. Students also have access to a comprehensive revision notes booklet containing summaries and worked examples. To support active learning, the program includes quizzes that allow students to check their understanding. These quizzes draw on past VCAA multiple-choice questions as well as MAV trial exam questions and other exam-style problems, providing immediate feedback on student progress.

Technology use is also addressed through CAS-focused sections, with exam-specific tips for both TI-Nspire and Casio Classpad devices. The program concludes with a live Q&A session shortly before the exams, giving students the opportunity to clarify remaining questions with a subject matter expert.

Importantly, the program functions not only as a revision tool but also as a study aid that students can use throughout much of the year. Because the material is available on demand, students can revisit explanations and topics whenever needed. This is an approach that often proves more effective than a single revision lecture where a large amount of information is delivered in a short time.

Ultimately, effective revision is not simply about repetition – it is about purposeful practice. When past exams are used thoughtfully through timed practice, targeted discussion, collaborative analysis and varied classroom activities, they become far more than just a collection of questions. They become one of the most powerful tools we have to help students approach the VCE mathematics examinations with confidence and clarity.

MATHS TALENT QUEST

LEAD YOUR STUDENTS THROUGH AN EXPLORATION FULL OF MATHEMATICAL WONDER

A Year 6 student investigated how much it would cost to own a dog for a year. The investigation earned a High Distinction in the 2025 Maths Talent Quest.

MAV's Maths Talent Quest (MTQ) aims to promote interest in mathematics and foster positive attitudes amongst students, teachers and parents. The focus is on the process of mathematical investigations. Students explore all kinds of topics, for example:

- How much does it cost to own a dog?
- Why is time important?
- The spread of misinformation
- The effects of overfishing in the Great Barrier Reef
- Is public transport cheaper than driving?
- Folding paper planes
- Can we predict who will win the AFL Grand Final?
- What 3D shape can hold the most M&M's?
- The maths behind mountain biking

WHO CAN ENTER?

Individuals, small groups or classes from F - 12. Your students can work on their investigations anytime between now and the end of July.

HOW DO I ENTER?

Enter online: www.mav.vic.edu.au/student-activities/mathematics-talent-quest. Registration is open now, it will close on Friday 31 July 2026.
Online judging takes place from 10 - 21 August 2026.

Got questions? Keen to learn more?
Reach out to Renee Ladner for more information contact mtq@mav.vic.edu.au

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MTQ MATHS TALENT QUEST

REGISTER NOW:
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CAPACITY AND CONNECTION

Renee Ladner, MAV Education consultant, Alanna Duffy and Becky Hall, Yalingbu Yirramboi School

BUILDING CAPACITY, CONNECTION AND A TRAUMA-INFORMED APPROACH TO NUMERACY ASSESSMENT

Yalingbu Yirramboi, The Royal Children's Hospital School (YYRCHS) is an educational setting located within The Royal Children's Hospital, Melbourne. Yalingbu Yirramboi, means 'Today and Tomorrow' in the local languages of the Boon Wurrung and Woi Wurrung peoples, representing the idea of continuing health services to the community. The school plays an important role in keeping students connected to their regular early-learning or school setting, bridging the gap between hospital, home and their ongoing education. For many children, this connection provides comfort, familiarity and continuity during a deeply uncertain time.

CONTEXT

The partnership began in 2023 when Alanna Duffy, Learning Specialist, and Becky Hall, Numeracy Improvement Initiative Lead, joined the Melbourne and Maribyrnong Network Numeracy Middle Leaders Professional Learning program. From the outset, it was clear that their context required a highly responsive and trauma-informed approach to mathematics teaching. Students may remain in hospital for days, weeks or months. Their educational journey is marked by interruption, vulnerability and variability, not only in engagement, but in cognitive load, wellbeing and readiness to learn.

Standard assessment tools offered little value in this unique setting. As Alanna and Becky explained, many assessments were intrusive, time-consuming, or ill-fitted to the needs of students working through illness and recovery. What was needed was a way to quickly and sensitively understand a student's mathematical baseline, without compromising trust, wellbeing or relationships.

This challenge became the catalyst for building a numeracy improvement team, strengthening teacher capability and ultimately creating a new type of formative assessment: the Numeracy GIFT (Gap Identification Formative Toolkit).

Figure 1. Becky and Alanna have developed a trauma-informed approach to mathematics.

BUILDING TEACHER CAPACITY

Throughout termly network meetings, Alanna and Becky developed a clear prioritisation map that aligned their goals with actionable steps for the classroom. Their early focus was building a dedicated numeracy improvement team, and Becky leading professional learning sessions that centred on key research from Di Siemon, George Booker and Peter Sullivan. This helped teachers deepen their understanding of number sense, common misconceptions and the importance of explicit, targeted instruction.

Their vision was simple but ambitious: empower teachers to confidently meet each student where they are, using trauma-informed tools grounded in Australian based research, clarity and compassion.

THE NUMERACY GIFT

Teachers at YYRCHS understood that on any given day, a student's capacity to engage might shift dramatically. What remained constant was the need to build rapport and establish psychological safety. This meant prioritising formative assessment that was non-threatening, relationship-centred and genuinely useful.

Across years of experience, the team noticed recurring gaps in student understanding, gaps often exacerbated by intermittent schooling caused by health conditions. They recognised that working 1:1 with students offered a unique opportunity to rebuild foundational skills. Clarke, Clarke and Roche (2011) were instrumental in providing evidence through their research 'Building teachers' expertise in understanding, assessing and developing children's mathematical thinking: the power of task-based, one-to-one assessment interviews' in order to derive an efficient way to diagnose needs without relying on formal or stressful tests. Traditional assessments failed to meet this need. As a result, the numeracy improvement team, launched in 2023, and worked throughout 2024 to develop an intervention-style assessment that blended research, play and pedagogy.

CAPACITY AND CONNECTION (CONT.)

Renee Ladner, MAV Education consultant, Alanna Duffy and Becky Hall, Yalingbu Yirramboi School

As the team noted:

> 'Formal, traditional style assessments, upon admission to hospital can be intimidating, compromise trust, and may discourage engagement. In response to this challenge, the Numeracy Gap Identification Formative Toolkit (Numeracy GIFT) was developed.'

> 'We knew that working 1:1 with students provided a unique opportunity for rich mathematical discussion where students could share their thinking and teachers could gain a deep understanding of the conceptual knowledge students had. The key was to embed this discussion in the joy of a game. The number one thing we said to the teaching team when we rolled it out was conversation is king.'

Research strongly supported their direction. As Russo, Bragg and Russo (2021) report, mathematical games assist in 'the acquisition and development of concepts; reinforcement and practice; developing problem-solving skills; and, motivation' (p. 408). These principles formed the backbone of the Numeracy GIFT.

NUMERACY GIFT INSPIRATION

Jill Brown's (2024) research advocates for students to be 'active listeners and explainers' (p.1) of their mathematical thinking. When this is embedded in learning, the 'roles of the teacher and learner change.' (p.1). The team embraced this influence and set out to ensure this was embedded in their assessment and teaching approach.

The team needed a way to quickly understand students' academic baseline so they could target teaching to best meet their needs. The tool embeds trauma-informed practices as a core principle, aiming to provide a non-confrontational assessment experience for students. They also identified the core mathematical ideas that underpin future learning, eventually focusing on five elements which became the organising principles for the Numeracy GIFT.

- subitising and part-part-whole thinking
- place value
- mental strategies and the four operations
- fractions
- mathematical reasoning and language.

INSIDE THE NUMERACY GIFT

The toolkit includes five assessment games:

- *Trust the Count*: Subitising and early counting
- *Number Ladder*: Place value, ordering numbers and addition
- *Total Recall*: The four operations
- *Fraction War*: Fractions and proportional reasoning
- *Number Detective*: A range of number topics.

Every activity is supported with:

- clear instructions
- a detailed rubric
- manipulatives
- teacher prompts
- enabling and extending questions.

The team emphasised the importance of keeping the number strand at the centre:

> 'A strong grasp of these core concepts underpins all future mathematical learning... we listed out key skills and understandings in number that are essential for further mathematical learning and for life as a numerate citizen.'

APPLYING RESEARCH TO PRACTICE

In 2024, YYRCHS transitioned to a Victorian Department of Education school, aligning teaching practice with Department policies and the VTLM 2.0.

In 2025, the team began refining the Numeracy GIFT using research from Di Siemon's Big Ideas in Number, Ange Rogers' Place Value, Jo Boaler' Mindsets and others. The aim was to deepen the diagnostic quality of each task.

One powerful example was the redevelopment of Number Ladder, which assesses place value and early computation. Teachers felt confident using the game for initial rapport-building but wanted clearer alignment to curriculum levels and next steps.

Using Dr Ange Rogers' six aspects of place value, the team undertook a rigorous review, pulling apart the current rubric, questioning what was meant by certain questions and strengthening its ability to reveal conceptual understanding rather than surface-level responses. Learning intentions and success criteria were mapped, giving teachers a well-sequenced trajectory for instruction.

This reflective practice exemplifies their commitment to ongoing improvement.

TEACHER VOICE AND BUILDING A NUMERACY GIFT 2.0

Eight months after the rollout, teacher feedback was formally gathered. Staff expressed appreciation for the clarity and usefulness of the Numeracy GIFT while also identifying new opportunities:

> 'Teachers identified additional content areas they wanted to be able to assess (such as decimals, negative integers and algebraic thinking). This feedback is now directly informing a '2.0' version of the Numeracy GIFT.'

This iterative process is sustained through strong relational trust. Sexton (2025) refers to relational trust as not a personality trait, but a deliberate teaching and leadership practice that grows through actions which build safety, empathy, and trust in the classroom.

Alanna and Becky embody this leadership. Through PLCs, coaching, modelling and open dialogue, they have cultivated a culture where teacher expertise is valued, and collective growth is non-negotiable.

IMPACT AND NEXT STEPS

The Numeracy GIFT has now been used more than 200 times since early 2025, a testament to its accessibility and value. Teachers report deeper insights into student learning, more meaningful conversations with families and schools, and confident planning of targeted instruction.

The work at YYRCHS continues to build on strong foundations:

- a commitment to trauma-informed, student-centred assessment.
- research-aligned tools that give teachers clarity.

- a culture of collaboration, reflection and relational trust.
- a belief that every child can experience success in mathematics.

The team noted that maths is more than numbers, it is also an incredible opportunity to work with students to develop transferable skills such as persistence, reasoning, and critical and creative thinking.

The Numeracy GIFT is not just an assessment toolkit, it is a testament to thoughtful practice, courageous innovation and the profound impact of meeting each learner exactly where they are.

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STIMULATING THINKING

Jessica Kurzman, Maths leader, St Patrick's Primary School

A picture sparks 1000 maths concepts! Use this picture as a prompt to stimulate thinking. If you have other ideas for investigations or lessons that could stem from the ideas here, add them to the conversation on our social channels. You can find us on Facebook and Instagram @maths.vic, LinkedIn @ maths-vic and on X, @maths_vic.

EARLY YEARS

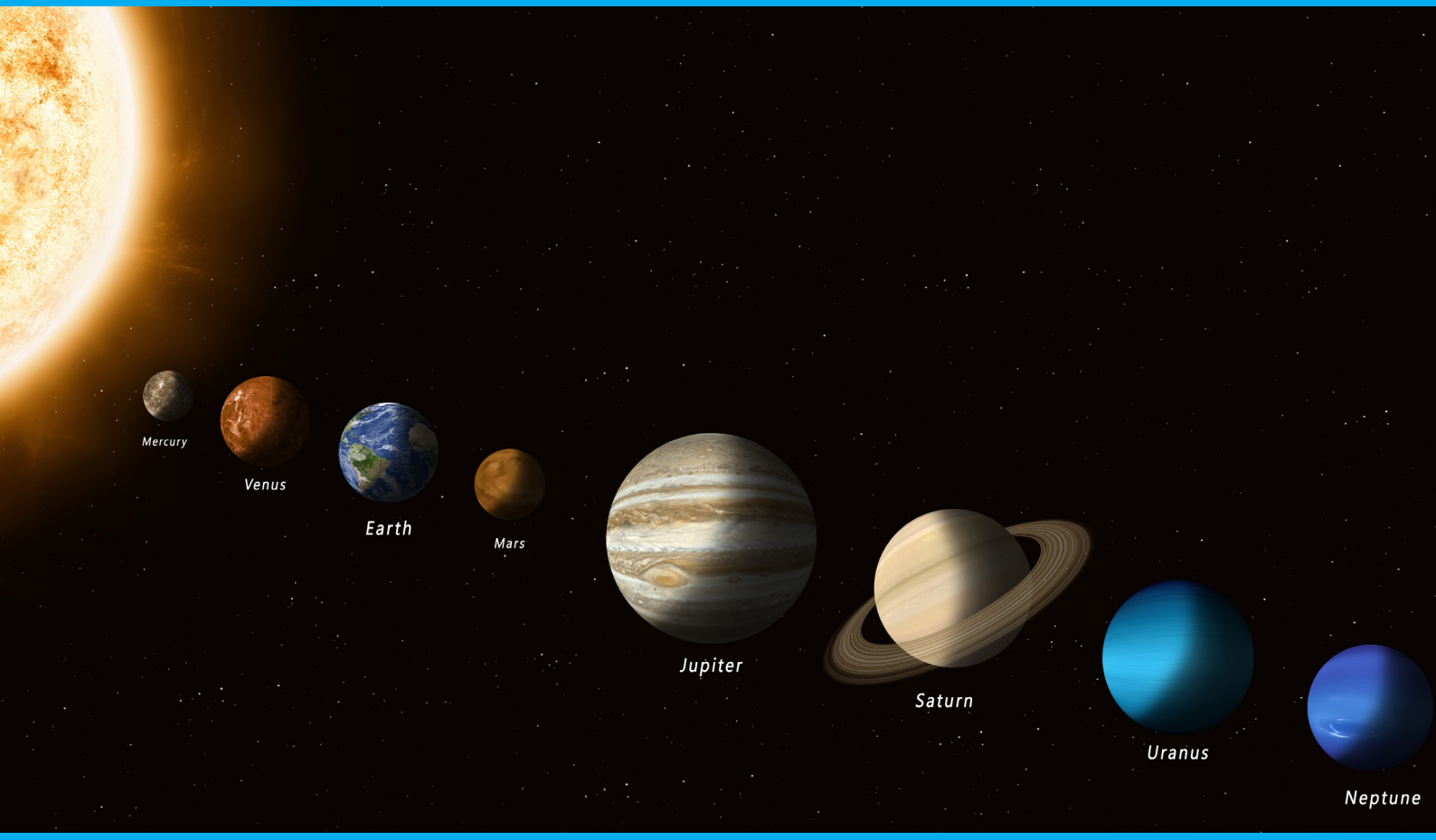
- How many planets have blue on them? Look carefully at the picture, then search around the room to find the number that matches the number of planets with blue.
- What is the same about the planets? What is different?
- Do you think the planets are flat or round? Explain your reasons.
- Can you find some objects around the room that are the same shape as the planets?
- Saturn looks different to the other planets - can you explain why?
- Which planets are large and which ones are small? Which is the largest? Which is the smallest? How do you know?
- It looks like the sun is glowing - why do you think that might be?
- Do you think it would be hot or cold on each of the planets? Explain your reasons. Which one would be the hottest and why? Which one would be the coldest and why?
- Earth is the third planet from the Sun. Line up with your friends - the third person is Earth, so they sit down. Now mix up your line and do it again. What about if the first or second person sits down - which planets might they be?
- How many planets are there? Go outside and collect that many pebbles, leaves, sticks, petals or anything else you can find. Line them up like the planets.
- There are eight planets, but humans only live on one planet – Earth. Why do you think that might be?
- Can you think of other ways that Earth is different to other planets?
- Have you heard of a light-year? What do you think a light-year might mean?
- Earth has one Moon, but there are lots of other moons in the solar system. There are two planets that have over 90 moons! Which planets do you think they might be?

FOUNDATION - YEAR 2

- Cut out the picture of the planets. Can you arrange the planets in order from the planet that looks the smallest, to the planet that looks the largest?
- How many planets are there? Draw them in a way that makes it easy to see the total without counting one by one.
- Why do you think the planets appear half light and half dark? How might this relate to day and night?
- If you could visit half of the planets in this picture, which planets would you choose to visit? Now imagine you could only visit one-quarter of the planets - which ones would you pick this time? Explain your choices and what makes these planets interesting to you.
- There are eight planets in this picture. How many numbers can you write that are greater than eight? How many numbers are less than eight?
- Of the planets shown, imagine some are hot and some are cold. How many could be hot and how many could be cold? Show your ideas using a number sentence, and see how many different combinations you can create.
- Look at the planets in the picture. Choose two or three planets and create a repeating pattern with them. See if a friend can continue your pattern. How many different repeating patterns can you make with the same planets?
- Suppose each planet has the same number of stars around it. How many stars might each planet have? Can you work out the total number of stars there would be without adding them one by one? Try a few different numbers of stars per planet and see how quickly you can calculate the totals. Record your answers in a table.
- There are eight planets in the Solar System. Imagine some planets are hidden behind the Sun. How many planets might you not see and how many might you still see? Try different numbers of hidden planets, and write a subtraction number sentence to show how you worked it out each time.

YEARS 3 - 6

- Survey 20 people to find out which planet they would most like to visit. Create a graph that illustrates the results clearly. Interpret the results by providing at least three sentences to describe your findings. Show the same data on a different graph. Which graph represents the data better and why?
- Investigate the actual distances of each planet from the Sun. Create a model using a chosen scale (e.g., 1 cm = 10 million km) and place each planet in its correct position.
- Estimate how many Earths could fit across the Sun's diameter by finding out their actual sizes. What does this tell you about how much larger the Sun is than Earth?
- The average distance from Earth to the Moon is about 384,400 km. Imagine a spacecraft traveling at 10,000 km per hour and calculate how long it would take to reach the Moon. Then, consider a slower spacecraft traveling at 4,000 km per hour and work out how long that journey would take. Compare the two times. How fast would the spacecraft need to travel to reach the moon in 24 hours exactly?
- For each planet, identify its distance from the Moon. Then calculate half of that distance, followed by three-quarters of the distance. What patterns or interesting observations can you make when you compare these values?
- Imagine you could go on a trip to visit the planets. The costs are: Mercury $50, Venus $75, Earth $113, Mars $89, Jupiter $158, Saturn $143, Uranus $125, and Neptune $130. If you had $500, which planets could you choose to visit, and how much money would you have left? Now, create your own Planet Travel Shop. Assign a price to each planet, then invite a friend to pick three or four planets to visit. Have them calculate the total cost and work out how much change they would receive from $2000.



YEARS 7 AND ABOVE

- Compare the diameter of the Sun to Earth by finding the actual diameters of both. Calculate the ratio of the Sun's diameter to Earth's and think about what this shows about how much larger the Sun is compared to Earth. Repeat for each of the other planets.
- Investigate the average distances of the closest planet, Mercury, and the farthest planet, Neptune, from the Sun. Calculate the ratio of these distances and consider what this tells you about the scale of the Solar System.
- Represent the diameters of all the planets on a scaled bar graph. Use a scale such as 1 cm = 10,000 km. Discuss any patterns or observations you notice.
- Calculate the percentage difference in diameter between Mars and Venus. Then calculate the percentage difference between Saturn and Neptune. Compare the relative differences for inner and outer planets.
- Use the diameters of the planets to create a pie chart showing the proportion of the total planetary diameter each planet represents. Which planet contributes the most? Which contributes the least?
- Compare the sizes of the cores of different planets. For example, how does Jupiter's core diameter compare to Earth's? Calculate the ratio and discuss what this tells you about planetary structure.
- Design your own fictional planet. Draw a cross-section and decide how thick each layer should be. Calculate the fraction of the planet made up by each layer and explain your choices.
- Draw a line graph showing the relationship between distance from the Sun and planet diameter. Discuss any trends or patterns you notice.
- Investigate whether planet size changes as distance from the Sun increases. What do you find?
- Research the average surface temperatures of the planets. Plot average temperature vs. distance from the Sun on a graph. Discuss any trends or anomalies.
- Look at the distances between neighbouring planets. Which gap is the largest? Does the size of the planets have any relationship to these gaps? Discuss your findings.
- The distance from Earth to the Sun is 149 million kilometres. Estimate the distance from the Sun to Neptune.
- Research the launch dates of at least five space missions. Draw a timeline and mark each mission.

MAV education consultants can come to you and create a professional learning plan to build the capacity of teachers at your school. Reach out to our friendly team: primary@mav.vic.edu.au or secondary@mav.vic.edu.au.

A SLAM DUNK: OFF TO NEW YORK

Carmen Bruce, Maths leader, St Damien's Primary School

WHAT IS NBA MATH HOOPS?

NBA Math Hoops is an exciting, basketball-themed mathematical board game created by Learn Fresh in partnership with the NBA. Using real NBA and WNBA player statistics, the game challenges students to build teams, make strategic decisions, and apply mathematical operations such as addition, subtraction, multiplication, and division – along with probability and critical thinking. Available in both digital and physical formats, it offers a rich curriculum designed for students in Years 4–8.

What makes NBA Math Hoops especially powerful is the way it seamlessly blends maths learning with something students genuinely enjoy: sport. Beyond academic skills, the program supports the development of self-regulation, teamwork, and resilience. Designed to be used in classrooms, after-school programs, or at home, it provides a fun and meaningful way for students to strengthen their algebra readiness and confidence.

At St Damian's, NBA Math Hoops has been embraced enthusiastically for the past three years. Teachers appreciate its curriculum alignment and its ability to engage students in deep mathematical thinking while also supporting social and emotional learning.

BIG DREAMS

The impact of the NBA Math Hoops program is clearly illustrated in students like Orion. His journey began in 2023 when St Damian's introduced the game to the entire Year 5 cohort through friendly tournaments. Six outstanding players were then selected for the Victorian Championships, where Orion and his partner Ian made it all the way to the semi-finals, narrowly missing out on a place in the final match.

This experience developed Orion's skills in mental maths and strategy – also it sparked something deeper. The combination of competition, teamwork, and fast-paced thinking inspired him to take his involvement even further.

THE GLOBAL CHAMPIONSHIPS

Motivated by his passion for the game, Orion applied for the NBA Math Hoops Global Championships.

Figure 1. Orion's engagement in Math Hoops ignited a love of mathematics.

His application stood out, earning him the honour of representing Australia on the global stage in New York City. Orion was paired with a student from Puerto Rico, forming a cross-cultural team that embodied the international spirit of the event. Although the pair didn't progress beyond the first round, the experience was unforgettable. Highlights of Orion's time in New York included a private tour of NBA headquarters, VIP tickets to the 2024 NBA draft, meeting new and upcoming NBA players (and collecting autographs!) and of course, sightseeing.

These experiences, combined with the friendships and memories made at the Championships, left a lasting impression.

STRENGTHENING ORION'S LOVE OF MATHEMATICS

Orion's journey with NBA Math Hoops has been a major catalyst in his development as a young mathematician. What began as a fun classroom game quickly transformed into a genuine love of mathematical thinking.

The strategic decisions, quick calculations, and problem-solving required during gameplay encouraged him to think creatively and pushed him to strengthen his skills. Orion discovered that maths could be active, exciting, and connected to real-life contexts. This shift motivated him to take on new challenges, participate in school-wide extension opportunities, and approach difficult problems with greater confidence and persistence. Orion has grown into a determined and enthusiastic learner, someone who enjoys pushing through challenging tasks and celebrates the satisfaction of finding solutions.

GET INVOLVED

Orion's journey shows what can happen when learning is joyful, active, and meaningful. Programs like NBA Math Hoops help students build skills, confidence, and resilience – on and off the court.

Visit www.nbamathhoops.com to learn more.

MILGATE PRIMARY: MATHS ACTIVE

David Cook and Renee Ladner, MAV

As part of MAV's Maths Active Schools initiative, Milgate Primary School hosted a school visit to showcase its ongoing commitment to high-quality mathematics teaching and learning. Assistant Principal, Jayde Williams, warmly welcomed MAV into the school and led us through classrooms from Foundation to Year 6.

Across the school, several consistent themes were evident. Each learning space was well resourced with a broad range of manipulative materials, with additional and larger resources accessible through the library. Technology was purposefully integrated alongside physical materials to support students' mathematical thinking and task completion. Commercially produced and teacher (or student) made posters were visible in every classroom, outlining key mathematical ideas, learning expectations, and summaries of previous learning. Student work samples and learning reflections were also displayed, contributing to a strong sense of student voice and agency.

Learning intentions and success criteria were clearly displayed, alongside descriptions of the main task and extension tasks. Teachers and students referred to this information throughout lessons to clarify purpose, support decision-making, and guide reflection.

Students were unfazed by the presence of visitors and confidently engaged with their learning. Across all year levels, students articulated their thinking clearly and described the strategies they were using. Opportunities for students to explain and refine their thinking were intentionally embedded within classroom routines and clearly valued.

Teachers used pre-planned, purposeful questioning to assess understanding and monitor progress using checklists and anecdotal notes. Students responded to tasks in a variety of ways, recording their thinking in forms that made sense to them and showing interest in their peers' approaches. Teachers leveraged these moments to probe understanding and provide targeted feedback.

A highlight of the visit was observing Mathematics Learning Specialist, Sian Katsineris, at the conclusion of a lesson

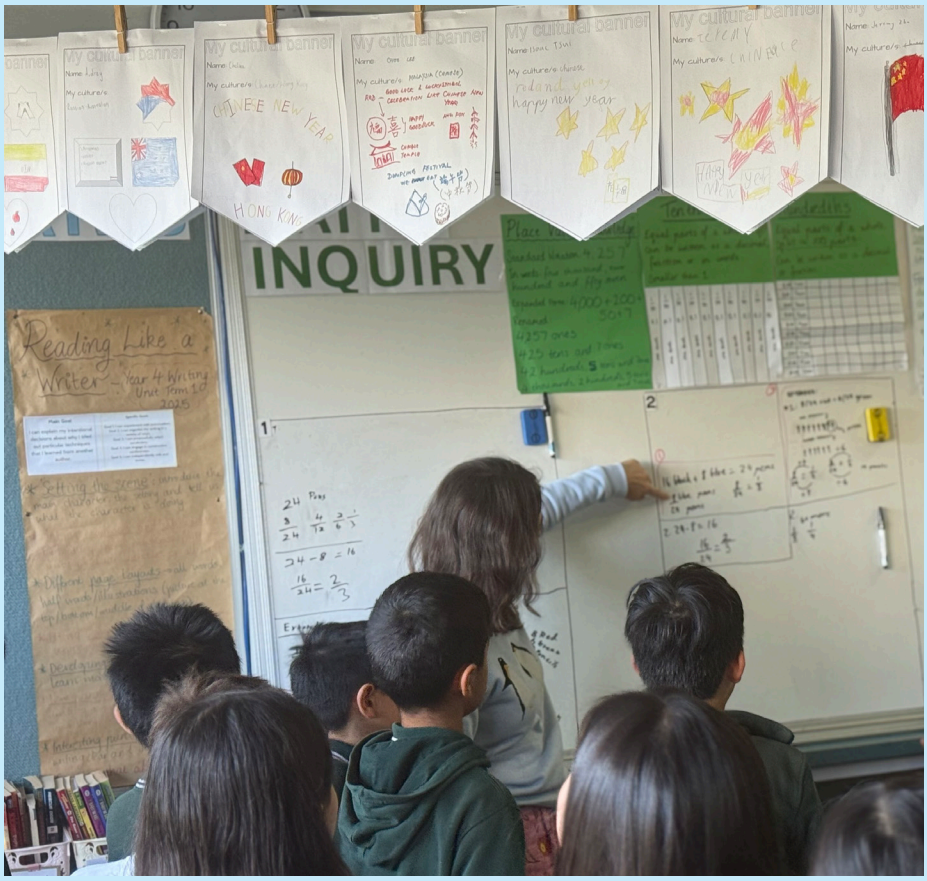


Figure 1. Sian Katsineris summarising students thinking and bringing together the learning intention for the lesson.

focused on fractions and problem solving based on Peter Liljedahl's, *Thinking Classrooms*. Students had worked collaboratively to record their thinking on large posters using drawings and numerical representations. Sian drew on these artefacts to explore the range of strategies present, facilitating rich whole-class discussion through skilful questioning and explicit reference to the learning intention and task. Students confidently advocated for their group's thinking, demonstrating curiosity, ownership, and the use of accountable mathematical language within a supportive learning environment.

Jayde shared the school's future priorities and its commitment to continuous improvement grounded in research-informed practice. A strong focus on student wellbeing, both academic and social, was evident. One identified area for further development is strengthening teacher confidence and trust in formative assessment to respond to student learning in the moment. The continued use of extension prompts to ensure appropriate challenge is maintained for all learners, particularly those working above the expected standard, remains an important focus.

Milgate Primary School's dedication to placing mathematics at the forefront of school improvement is commendable. The school's use of evidence-informed teaching approaches have been thoughtfully trialled and refined to suit their context. The visit provided valuable insight into how the Assistant Principal (Curriculum) and Numeracy Leader work collaboratively to ensure the school's vision for mathematics continues to build towards a strong and sustainable future. Milgate Primary is a great example of a Mathematics Active School.

BECOME RECOGNISED AS A MATHS ACTIVE SCHOOL

Get recognised for your schools' effective learning and teaching practices in mathematics. Contact Renee Ladner, rladner@mav.vic.edu.au to discuss how to get Maths Active accreditation.

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IMPLEMENTATION MATTERS

Michael Rosenbrock

I am well aware that, from my experience, I look at most things in education through the lens of implementation. As the saying goes, if 'you have a hammer, everything starts to look like a nail'. But if you are a carpenter (in the past at least), that may not be a bad thing! I remain convinced that being aware of and attentive to effective implementation is essential to our long term impact and effectiveness as teachers and school leaders.

Implementation is often a short-cut term used for 'getting stuff done', taking action or making things happen. It can seem a bit cold, corporate and project-manager ish. But it is more than that. It is about being really clear, deliberate and reflective about the why, what and how of where we direct our efforts and make use of our finite resources.

WHY

It is vital that we understand our why, so that we know what is causing us to act. This includes: student and community needs, personal values and expertise, school and system priorities, and what data is telling us about what is happening in our context. Ultimately this leads us to work through identifying the root cause of the problem of practice we want to work on improving right now.

For example, we may draw on our own observations, internal assessment tasks, student feedback and NAPLAN data to conclude that our students are struggling to work independently when solving mathematical problems. This may be an accurate assessment of the outcome, but more digging is required to find out why it is happening. It could be due to low fact fluency or a need for more scaffolding or a need for more supported application and independence (or something else altogether). We need to use our professional judgement to work through this, gathering more information and testing our reasoning as we go.

WHAT

Once we are clear on what we want to work on, the next step is to identify the solution. Sometimes we get this backwards, having found a great solution that excites us, we then fit a problem to it. I like to call this shiny thinking or chasing butterflies. That may work out ok sometimes, but as mathematics teachers, the odds aren't in favour of that approach.

To rigorously identify what to focus our efforts on, it is important to draw on: available research evidence, experience from practice, knowledge of our context, and professional judgement. We don't have infinite time, so it can be useful to use trusted resources to help with this. Sometimes there are many promising solutions, many good things we want to do. But we can't do everything at once. Or at least we can't do that well! So prioritisation is important. This can mean bringing an evaluative mindset to determine what is the best balance of effort vs potential impact for us right now.

Returning to the previous example, if the problem was scaffolding then providing additional support and guided practice may be an effective solution. But that is probably still too broad to act upon. Digging deeper and getting as specific as possible, we may decide that a focus on worked examples is our best priority focus right now. That is a much tighter focus, but even then, probably too large a target. If we want the best chance at turning a good idea into action amongst the business of school, we may need to be a lot more specific. For example focussing on using worked examples for guided practice in perimeter and area of shapes during Term 2 with our Year 5 classes.

HOW

The how is my favourite part of implementation. Not just because it is where we get to the doing, but also because it is where we dig into the nuance and details of adapting practices to our context. It can be helpful to consider different perspectives on the practice we are looking to implement.

Understanding the core components that underpin the effectiveness of a practice is essential. This is about getting beyond the surface of what we call the thing, such as worked examples, to what makes it tick.

For worked examples the core components may include: reducing unnecessary cognitive load by borrowing some expertise via the example; tightly pairing new

learning with opportunities for practice before variation; and providing a stepping stone or bridge between instruction and independent practice. Knowing the core components allows us to make faithful adaptations to suit our context.

On the other hand, lethal mutations are the ways in which we could implement a practice and end up making it ineffective. I expect we have all experienced these. If we are aware of the potential for lethal mutations up front we can be pre-emptive and take action to stay on course.

For worked examples, potential lethal mutations include: replacing instruction instead of scaffolding practice (we still need initial instructional examples); over-use with experts (the expertise reversal effect suggests they are less beneficial for learners with more expertise); creating confusion with examples of mistakes (these need to be very clearly sign posted); or adding additional cognitive load with prompts, formatting or excessive detail.

Finally, as we get into trying something out, it is important that we pay attention to how it is going and keep adapting. On one hand this may look like completely revisiting a new approach that is simply not working. But on the other, it may come down to making subtle adjustments to ensure that it is working as well as possible in your specific context.

For worked examples you may find that you need to adapt the pace and detail depending on your specific cohort – one cohort may need more examples, broken down into smaller chunks whilst another cohort may need less.

A FINAL WORD

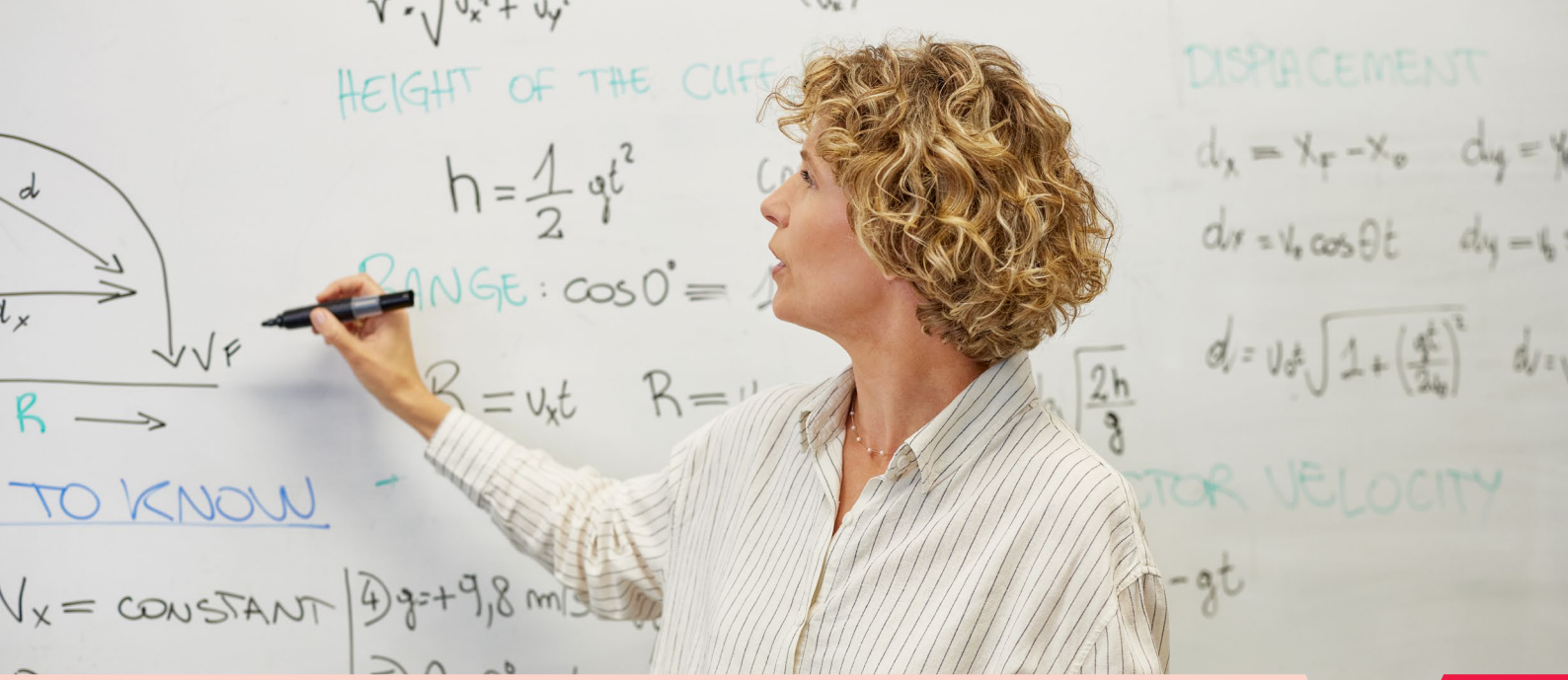
Implementation is adaptive and iterative in nature. Whether you are trying out worked examples with your Year 5s in Term 2 or leading a whole school approach to explicit teaching, drawing on lessons from implementation can help every educator to have a greater impact.

Michael is a presenter at the Melbourne Mathematics Conference (MMC). His keynote will focus on evidence-informed learning and teaching in mathematics. The MMC has four streams:

- Leadership: Lead excellence in maths education.
- Primary: Strengthen pedagogy and champion equity.
- Early childhood: Inspire curiosity and confidence through play.
- CAS pedagogy: Use technology to enhance reasoning and exploration.

The conference will be held at The University of Melbourne on 3 and 4 June.

Register at www.mav.vic.edu.au.



The Education State

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ONE MINUTE: RACHEL POLLITT

I'M ...

Rachel Pollitt, a Research Fellow in the Research in Effective Education in Early Childhood (REEaCh) Centre, University of Melbourne; an internationally accredited leadership coach and early years consultant.

PLAYBASED LEARNING...

Is important as it provides children with many varied ways to demonstrate their interests, develop in their own way and in their own time. By creating responsive and culturally safe learning environments, educators have the space to engage with and expand on children's ideas during their play explorations.

MOVING TO ACADEMIA...

Has been the bridge between theory and practice.

WE HAVE...

Everything to learn from First Nations people, as they are the original experts in STEM.

I'M NOT JUST INTERESTED IN...

Embedding First Nations content in mathematics; I am interested in First Nations ways of being and knowing which are relational, interconnected and essential to context and place-based learning.

BRAVERY IN MATHEMATICS...

Requires taking a deep breath. It takes persistence to challenge long-held beliefs about our mathematical abilities, and the anxieties often associated with this. These long-held beliefs are often formed in the early years and compounded throughout formal schooling hence the importance of seeking support, and taking time to unpack and reflect on what is going to help you engage in mathematics teaching and learning with young children. The types of mathematics concepts young children typically engage in do not always align with our emotional responses to the word 'mathematics.' Focusing our attention on children's curiosity about and engagement with mathematics learning processes during play takes the focus away from getting mathematics 'right,' and can help to relieve anxiety.

FROM A VERY YOUNG AGE CHILDREN ARE...

Mathematicians. Educators expand on children's mathematics language, concepts and strategies, contingently responding to children's inquiry with warmth and enthusiasm. It is about focusing on opportunities for mathematics learning throughout the day – linking language and concepts to children's experiences and environments.

EARLY CHILDHOOD TEACHERS...

Need increased recognition, evidence-based professional learning and much higher wages.

STRENGTHS-BASED APPROACH...

Promotes confidence and wellbeing, curiosity and a love of exploration and inquiry.

NUMERACY...

In early childhood is the foundation of all learning, particularly language and literacy.

COACHING IS...

Critical – it supports you to know more about yourself, understand your habits and keep yourself on track. A coaching approach to leadership focuses on bringing out the best in yourself and your team while creating a coaching culture across your organisation.

COLLABORATION IS...

Essential. Socio-cultural learning is continuous throughout life, and collaborating with those around us brings clarity, focus and a shared enthusiasm for the projects we are constructing together.

THE LAST BOOK I READ...

Listening to Country – A Journey To The Heart Of What It Means To Belong by Ros Moriarty. It is stunning.

ONE DAY I WILL...

Inform policy change about the importance of mathematics teaching and learning in early childhood education.

INSIDE THE DISCUSSION

Jen Bowden, CEO, MAV

MAV ANNUAL CONFERENCE: TOPIC DISCUSSION GROUP HIGHLIGHTS, TRENDS AND WHAT'S NEXT

At the 2025 MAV Annual Conference, educators from across Victoria came together to share practical strategies, candid challenges and bold ideas across our Topic Discussion Groups. A clear picture emerged of a profession committed to activating mathematical understanding and confidence through evidence-informed practice, wellbeing, collaboration and culturally responsive teaching.

In curriculum conversations focused on the Victorian Curriculum 2.0, participants reported genuine wins in building strong learning relationships and lifting engagement through applied, rich and investigative tasks. At the same time, they were frank about persistent constraints: staffing shortages and out-of-field teaching, limited planning time, an overloaded curriculum, student behaviour, and workload pressures that deter new teachers from applying.

A notable opportunity under discussion was the value of a single Victorian curriculum grade to increase consistency and support growth measurement, alongside a thoughtful reconsideration of whether progression points are the best representation of student achievement levels.

Primary colleagues exploring mathematical modelling emphasised modelling as a cyclical, iterative process: understanding a real-world problem, making assumptions, representing it mathematically, testing solutions and refining thinking. Rich, adaptable tasks were championed as accessible entry points across year levels, building student agency, mathematical talk and multiple strategies.

Purposeful questioning, use of data and structured reflection were highlighted as drivers of deeper reasoning. From a leadership perspective, the group stressed the importance of building teacher confidence, using shared protocols and embedding modelling as a consistent, practical pedagogy across the school.

Participants exchanged resources from Jill Brown, Maths Hub and reSolve.

Strengthening primary–secondary partnerships remains a priority. Schools described building networks to smooth transition, close knowledge and skills gaps, and strengthen pedagogy through cluster events, shared instructional models and dedicated numeracy leads. Fortnightly teacher meetings, vertical curriculum maps, moderation across levels and parent engagement were cited as levers for consistency and reduced anxiety. Many started with a focused Year 6 to Year 7 bridge and scaled over time to keep implementation manageable and ensure all teachers received the same messaging. The main barriers were time to meet and plan, logistics for observations and communication, distance between schools and the slow work of building interschool trust.

Evidence-informed pedagogy was a lively thread across both primary and secondary. In primary settings, the message was 'people before programs': invest in

teacher expertise so decisions reflect local context rather than one-size-fits-all solutions. Participants argued for a repertoire that includes explicit instruction and guided inquiry, with mathematics' discipline-specific representations and proficiencies guiding purposeful choices. Collaboration, coaching, protected planning time and reflective dialogue were seen as crucial to making thinking visible and strengthening reasoning. In secondary settings, schools reported strong gains through explicit teaching models, consistent routines and data-informed practice. Toolkits, numeracy games, elective pathways and academic supports boosted student confidence and staff collaboration. Challenges included time and workload, mixed messages about pedagogy, exam-driven mindsets and reluctance to productively struggle, technology constraints, rural isolation and inconsistent leadership. Future opportunities point to sharper differentiation, retrieval practice, resource sharing and careful integration of AI to reduce workload. Priorities included strengthening mathematical writing, reducing unproductive screen time and positioning mathematics as a lifelong skill.

Specialist Mathematics teachers shared inventive practices, from using Desmos and other digital tools to flipped classrooms, collaborative learning and playful contexts (jam donuts for calculus were a crowd-pleaser). Teachers emphasised aligning Units 1/2 with 3/4, asking open-ended questions and integrating physics links to deepen understanding. Barriers included gaps in prior knowledge, numeracy and literacy challenges, time constraints, absenteeism and limited regional support. Participants called for MAV-developed SAC materials, advocacy for structural changes, mentoring, masterclasses, AI tools to reduce workload and stronger networking through shared platforms and collaborative teacher days.

Assessment discussions in Years 7–10 highlighted wins with informal data collection, frequent checks for understanding and spaced-practice homework. Thinking Classroom routines supported deeper questioning and close observation of student reasoning. Tiered tasks and introducing VCE terminology in Years 7–10 were helping alignment and progression. Barriers included variable student resilience, teacher knowledge gaps, the time required for quality investigations, fear of over-challenging due to cognitive load concerns, too much formal testing and competing homework expectations. Looking ahead, teachers are prioritising research and investigation tasks, progress-focused feedback, hands-on activities, multi-strand CATs, rubrics that make growth visible and time-saving — but critically evaluated — AI supports.

Wellbeing was front and centre in both primary and secondary conversations. In primary contexts, participants noted how early experiences, parental messages and classroom culture shape students' mathematical identities. Students thrive when confidence, safety and mastery rather than speed, are prioritised. Teacher autonomy and wellbeing matter too: teachers model positive attitudes and create joyful, memorable learning experiences. Leadership that invites creativity and risk-taking fosters deeper understanding. One provocative question resonated: what if some assessment time were redirected to authentic, joyful learning, especially given limited year-on-year gains? In secondary contexts, using Julia Hill's Mathematical Wellbeing model, the group explored strategies to counter negative attitudes that undermine engagement. Teachers shared successes in a judgement-free space, emphasising that mathematics requires both skills and mindset. Persistent challenges include the primary-to-secondary transition, pervasive societal narratives like 'I can't do maths' and teacher wellbeing. Future goals centre on collaborative, discussion-rich routines, use of whiteboards, interactive activities and intentionally built relationships that grow mathematical confidence for students and teachers alike.

Culturally responsive mathematics teaching brought together a diverse group of educators in circle conversation and paired dialogues to reflect on practices and experiences across Australia. Participants stressed the importance of embedding Aboriginal and Torres Strait Islander perspectives for all students, acknowledging both challenges and opportunities. We extend our thanks to Dr Chris Matthews and Dr Jodie Hunter for their constructive support and challenge.

A practical recommendation for 2026 is to explicitly include 'Aboriginal and Torres Strait Islander perspectives' in the conference session title.

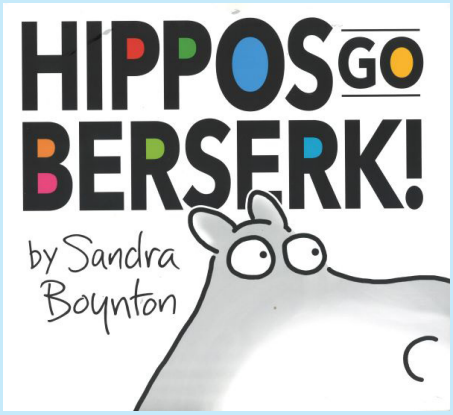
Cross-cutting trends and insights were clear. First, teacher capability is the strongest lever for improvement: targeted professional learning, shared protocols, coaching and reflective dialogue accelerate impact. Second, effective teaching blends approaches — explicit instruction, guided inquiry, rich tasks, retrieval practice and modelling — applied purposefully to context. Third, assessment is shifting toward growth: checks for understanding, tiered tasks and investigation are balancing the dominance of formal tests. Fourth, wellbeing is foundational; classrooms that normalise productive struggle without shame achieve deeper engagement. Fifth, transition and coherence matter; primary–secondary partnerships, shared language and vertical mapping reduce anxiety and strengthen continuity. Sixth, curriculum implementation must meet the workload reality of staffing, planning time and behaviour — tools that improve consistency and measure growth are in demand. Seventh, equity and relevance increase when culture and context are central, and real-world modelling is used to build belonging. Finally, technology and AI can reduce workload and enrich learning when adopted critically and purposefully.

Several discussion group summaries were not available at the time of publication and will be shared online when finalised. If you contributed and have artefacts or examples to add, we welcome your submissions. Thank you to the facilitators of each group who volunteered their time and expertise, to allow delegates the space to share and network.

MAV is excited to continue these conversations and run similar Topic Discussion Groups at this year's event, *Activating mathematical hearts, hands and minds*. Early bird registrations open soon. We look forward to welcoming you to deepen the dialogue, share what's working in your context and shape the next wave of mathematics education in Victoria.

BOOK REVIEW: HIPPOS GO BESERK!

Di Liddell, Education Manager, MAV



Hippos Go Berserk! is a lively, rhythmic picture book that introduces young children to counting, number change, and pattern through humour, repetition, and bold illustrations. As hippos arrive at a party, multiply, disappear, and reappear, readers are taken on an energetic journey of counting forwards and backwards, all wrapped in joy and celebration.

Boynton's accessible storytelling and clear visual cues make this book a powerful classroom resource for preschool and Foundation to Year 2 learners. The predictable structure and repeated language support early literacy development, while the visual progression of hippos provides strong entry points for exploring early numeracy concepts. Children are naturally drawn into counting along, predicting what will happen next, and noticing how quantities change throughout the story.

The joyful and inclusive tone of *Hippos Go Berserk!* is especially valuable in the early years, where building positive dispositions toward mathematics is critical. The book encourages children to see mathematics as playful, social, and connected to stories, music, and movement. By embedding mathematical ideas within a fun and engaging narrative, it supports confidence, curiosity, and a willingness to participate in mathematical thinking from an early age.

YOU CAN USE THIS BOOK TO:

- Support early counting skills through rhythmic, repeated number sequences.
- Explore counting forwards and backwards within a meaningful story context.
- Encourage prediction, explanation, and mathematical talk.
- Connect mathematics with oral language, visual literacy, music, and movement.
- Introduce multiple representations of number in developmentally appropriate ways.

Hippos Go Berserk! is more than a counting story. It is a rich early-years teaching tool that enables educators to make explicit connections between concrete experiences, visual representations, and abstract number ideas in playful and engaging ways. Here are some learning experiences for pre-school, Foundation and Year 1 classrooms.

EARLY YEARS: HIPPO PARTY DRAMATIC PLAY

Set up a hippo party using soft toys or counters. Children add or remove hippos and recount the total, explaining what happened to the number as changes occur.

Focus: Counting, number change, oral language.

EARLY YEARS: MAKE YOUR OWN COUNTING BOOK

Children create a short counting book inspired by *Hippos Go Berserk!*, showing numbers increasing or decreasing using drawings, symbols, or numerals.

Focus: Number sequencing, representation, creativity.

EARLY YEARS: MOVEMENT AND MUSIC COUNTING

Sing or chant counting songs while children act as hippos. Add or remove hippos mid-song to explore counting forwards and backwards.

Focus: Embodied learning, rhythm, number fluency.

EARLY YEARS: PATTERN PLAY WITH HIPPOS

Use hippo cut-outs or blocks to create repeating patterns. Children describe and extend each pattern.

Focus: Pattern recognition, reasoning, mathematical language.

EYLF outcomes alignment

These learning experiences support the Early Years Learning Framework through integrated play, language, and mathematical thinking:

Outcome 1: Children have a strong sense of identity. Children confidently share ideas, take risks in explaining their thinking, and see themselves as capable mathematicians.

Outcome 2: Children are connected with and contribute to their world. Shared counting, turn-taking, and collective problem-solving promote collaboration and a sense of belonging.

Outcome 4: Children are confident and involved learners. Children explore, experiment, predict, and persist as they represent numbers in different ways and explain their strategies.

Outcome 5: Children are effective communicators. Mathematical language develops as children describe quantities, explain representations, and engage in rich mathematical conversations.

FOUNDATION AND YEAR 1: HOW MANY HIPPOS? REPRESENTING NUMBER

Lesson idea: Read the first nine pages of the book, stopping at the page where all the hippos go berserk. Pause the story and pose the key question: *How many hippos are there?*

Invite children to think about how they know and to share or show their thinking.

Activities:

- Count the hippos together using the illustrations.
- Represent the total number of hippos in different ways.
- Compare and discuss different representations as a class.

Representations to explore:

- Pictorial: Highlight students who draw one picture per hippo, demonstrating one-to-one correspondence.
- Symbolic: Highlight students who use simple marks, tally-style dashes, or the letter h (for hippo).

- Numerical: Highlight students who write the numeral that matches the total number of hippos.

Mathematics focus:

- Counting and one-to-one correspondence.
- Representing quantities in multiple ways.
- Connecting concrete, pictorial, and abstract representations.

Victorian Curriculum (Version 2.0) links:

Foundation: VC2MFN01, VC2MFN02
Level 1: VC2M1N01, VC2M1N02

Proficiencies developed:

Understanding: Recognising that numbers can be represented in different ways.

Fluency: Counting accurately and confidently.

Reasoning: Explaining how the total was found.

FOUNDATION AND YEAR 1: COUNTING FORWARDS AND BACKWARDS THROUGH STORY

Lesson idea: Use the full story to explore how numbers increase and decrease as hippos arrive and leave the party.

Activities:

- Count aloud as each hippo arrives or disappears.
- Use counters, toys, or children to act out the story.
- Pause and ask children to predict what number will come next.

Mathematics focus:

- Counting forwards and backwards.
- Linking number words to quantities.

Victorian Curriculum (Version 2.0) links:

Foundation: VC2MFN02
Level 1: VC2M1N01

Proficiencies developed:

Fluency: Counting in sequence.

Understanding: Connecting number words and quantities.

Reasoning: Describing what happens when numbers increase or decrease.

Hippos Go Berserk! provides a strong foundation for joyful, meaningful mathematics learning. By blending humour, repetition, and clear numerical structure, it supports early number understanding while fostering positive attitudes toward mathematics. If you are interested in submitting a book review, please contact Di Liddell, dliddell@mav.vic.edu.au and share how you bring picture stories books to life in your classroom.

Hippos Go Berserk! belongs in every early-years classroom where play, movement, and thinking are central to learning.

Buy the book from the MAVshop: www.mav.vic.edu.au/shop.

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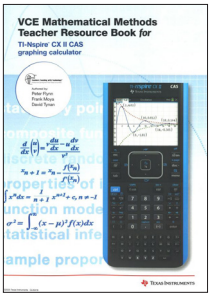
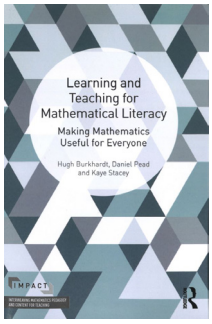


VCE METHODS MATHEMATICS TEACHER RESOURCE BOOK FOR TI-NSPIRE CXII CAS

VCE

This teacher resource book, supports senior secondary school mathematics teachers in Victoria as they seek to teach the VCAA Mathematics Study Design 2023-2027. This resource highlights ways in which TI-Nspire CAS technology might be used to assist in the teaching, learning and assessment of VCE Mathematics Methods Units 1 to 4. It is not a complete manual for using this technology, rather it tries to look at each syllabus dot point and make suggestions for possible classroom use. It has been developed by experienced educators and reviewed by senior mathematics teachers from Victorian schools.

$35 (MEMBER)
$43.75 (NON MEMBER)



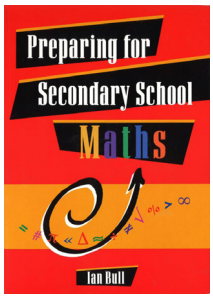
LEARNING AND TEACHING FOR MATHEMATICAL LITERACY

7 – VCE

Typically, most people don't realise when and how they can use the mathematics they were taught in high school – yet many of the mathematical ideas and skills can be a powerful tool for understanding how the world works. *Learning and Teaching for Mathematical Literacy* addresses this situation, offering practical strategies for developing a broader vision of mathematical literacy in the classroom and recognising the importance of maintaining these skills into adult life.

Filled with case studies and classroom activities and firmly grounded by practical applications for the classroom and beyond, this is an essential handbook for any teacher, teaching assistant, or mathematics subject lead who wishes to develop their students' mathematical literacy skills. This is also an ideal resource for those delivering or enrolled in teacher preparation courses.

$53.20 (MEMBER)
$66.50 (NON MEMBER)



PREPARING FOR SECONDARY SCHOOL MATHS

5–7

Are your students preparing for secondary school? This book is designed for students in their final year of primary school who want to ensure they are fully prepared for secondary school mathematics, are seeking revision and extra practice of basic skills

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