THE MATHEMATICAL ASSOCIATION OF VICTORIA

THE COMMON DENOMINATOR 1/26

BUILDING WHOLE SCHOOL CHANGE

INSIDE

Di Liddell, Education manager, MAV

BUILDING SCHOOL-WIDE CHANGE IN MATHEMATICS EDUCATION THROUGH BESPOKE PROFESSIONAL LEARNING

For more than four decades, the Mathematical Association of Victoria (MAV) has partnered with early childhood, primary, and secondary schools to design and deliver tailored professional learning experiences. Guided by our Professional Growth Model, MAV supports educators to lead meaningful, evidence-informed change in mathematics teaching and learning. We work collaboratively with schools to co-design professional learning and implement whole-school approaches that build capacity, strengthen practice, and improve outcomes for all students. Partner with MAV to create a shared vision for excellence in mathematics education and achieve lasting, school-wide impact.

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THE COMMON DENOMINATOR
The MAV's magazine published for its members.

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FROM THE PRESIDENT

Kerryn Sandford

MAV is more than an association – it is a collective of people who believe in the power of mathematics to shape thinking, open opportunities, and help young people understand the world and their place in it.

It was energising to meet so many teachers, leaders, academics, and learners at the 2025 MAV Conference. Registrations were strong despite the challenges many schools face with staffing and budgets. The positive, supportive buzz reflected the resilience of our mathematics community.

MAV's core purpose is to support the work you do in schools. MAV provides supports that are practical and aspirational:

- Professional learning grounded in evidence and shaped by real classroom realities.
- Resources that help build clarity, confidence, and coherence in planning and instruction.
- Advocacy that amplifies the voice of mathematics educators in curriculum, assessment, and system-level conversations.
- Networks and events that foster connection, shared problem-solving, and professional friendships that last well beyond a workshop or conference.

At a time when teaching can feel increasingly complex, MAV's goal is simple: to help you do your work well, with confidence and support. Leadership in schools plays a crucial role in the health of mathematics education. Effective leaders don't need all the answers; they create the conditions for teachers to think clearly, collaborate meaningfully, and make decisions that serve students. They prioritise clarity, respect teacher agency, model curiosity, and build belonging – cultivating teams where honest discussion and shared growth thrive. MAV will continue to support you to teach mathematics with:

Heart: nurturing relationships, honouring diverse learner identities, and cultivating joy in mathematical spaces.

Hands: engaging students in meaningful problem-solving, reasoning, modelling, and hands-on experiences.

Minds: fostering precision, depth, curiosity, and habits of thinking that empower young people to analyse, critique, explore, and create.

Teaching mathematics is both intellectual and deeply human. When we bring compassion, clarity, and community to this work, we offer students not just knowledge, but possibility. Thank you for your persistence, creativity, professionalism, and hope. You are part of a community that sees you, values you, and stands with you.

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*.

This dynamic event brings theory to life in the classroom, connecting educators, researchers, mathematicians, and industry professionals to explore how evidence-informed insights can transform maths teaching and learning. Experience engaging keynotes, hands-on workshops, and collaborative sessions designed to deepen understanding, build leadership, and inspire innovation.

FOUR INSPIRING STREAMS ONE UNMISSABLE CONFERENCE

- 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.

Connect. Learn. Lead. Be inspired to drive change!

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

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
NBA Math Hoops	12/2/26 13/2/26	4–8	Learn Fresh
Charting the path forward: goal setting for early childhood mathematics	12/2/26 (Virtual)	EC	Di Liddell
Developing mindsets for VCE Mathematics from Year 9	18/2/26 (Virtual)	7–10	Dr Jiqing Sun
Inspiring inquiry: how to lead the Maths Talent Quest at your school	25/2/26 (Virtual)	F–12	Danijela Draskovic and Renee Ladner
Supporting emerging mathematical drawing	3/3/26 (Virtual)	EC	Associate Professor Jennifer Way
Unlock the fun: planning and running a Maths Games Day	4/3/26 (Virtual)	F–12	Renee Ladner
An insight into the Victorian Coding Challenge	24/3/26 (Virtual)	5–10	Danijela Draskovic and Nathan Alison
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

BUILD ME UP FOR VCE TEACHERS

BUILDING CONFIDENCE IN TEACHING VCE MATHEMATICS

A hybrid professional learning program that equips teachers to step into VCE Mathematics with confidence. There are two Build Me Up streams available in 2026:

- General Mathematics Units 1–4
- Mathematical Methods Units 1–4

(Pathways for Specialist Mathematics and Foundation Mathematics are planned for 2027.)

2026 INTAKE - REGISTRATIONS OPEN LIMITED PLACES. SECURE YOUR SPOT.
www.mav.vic.edu.au/Resources/Build-Me-Up/BMU-VCE

WHAT'S INCLUDED

- 2 x full-day, in-person workshops (metro and regional): how key concepts, skills and processes are structured and sequenced from Unit 1 to Unit 4.
- 6 x 1.5 hour live online topic sessions: targeted deep dives — do the maths together and unpack approaches that work.
- 2 x 1.5 hour Q&A forums: connect with experienced VCE educators for timely advice and peer support.
- Bonus value: complimentary access to Build Me Up (Years 7–10) — all 14 modules to refresh prerequisite content and pedagogy (valued at $990).

DEVELOPED AND DELIVERED BY MAV

Developed and facilitated by expert VCE educators and curriculum leaders, led by Dr David Leigh-Lancaster and Jessica Mount, with practical resources you can use tomorrow — designed to improve teacher efficacy and student outcomes.

IS THIS COURSE FOR YOU?

Yes, if you are a teacher new to VCE, returning after a break, or keen to strengthen content knowledge and pedagogy for senior secondary maths.

FORMAT AND ACCESS

Hybrid delivery for state-wide access, with metropolitan and regional workshop options, plus live online learning.

COST

$1600 for MAV members, $2000 for non-MAV members. The cost covers all workshops, online sessions, Q&A forums and Build Me Up Years 7-10 access.

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BRIDGING THE GAP

Danijela Draskovic, Education manager, MAV

BRIDGING THE GAP BETWEEN MIDDLE YEARS AND VCE MATHEMATICS

It often starts with a tap on the shoulder. 'Would you be willing to take on Mathematical Methods next year?'

For many teachers, that moment sits somewhere between a compliment and a minor heart-attack. You can almost feel the shift in weight: CAS calculators, probability distributions, calculus, assessments that determine student futures. Suddenly, the familiar rhythm of middle-years maths gives way to a new, less certain pulse. That uneasy space between what we know and what stretches us, that's where the real learning happens.

When teachers hesitate to take on senior mathematics, it's often described as a 'confidence issue.' But confidence is only the symptom. The real cause is uneven mathematical command: not fully owning the content at the depth VCE requires.

Most teachers know the ideas in principle. What's missing is the ease and agility… the ability to move comfortably between representations, to explain why a technique works, or to link algebraic structure to graph behaviour.

That gap isn't a flaw. It's the natural outcome of focus. Years spent deep in the middle years building reasoning and fluency in domains such as rational number and linear algebra. These years sharpen some muscles while others go quiet. Concepts like logarithms, limits, or statistical inference fade simply because they're not used daily. But they're not gone. They just need reactivation. Like a language half-remembered, the grammar returns the moment you start speaking it again.

RECOGNISING CONNECTIONS

At first glance, VCE Mathematics looks like a steep mountain. The notation is heavier, the technology scarily futuristic, and the pressure real. But climb a little, and the view changes. Most of that terrain is familiar just steeper and more connected.

Polynomial division? It's the same logic as long division and simplifying fractions. Derivatives? A formal version of the rate-of-change thinking already embedded in Year 10. Probability distributions? The structured extension of sampling and variation.

Teachers often overestimate how far the leap really is. The mountain isn't as high as it looks; it's just covered in mist. Once the structure of the course is mapped out clearly, what seemed like new terrain becomes recognisable and teachable.

WHY DEPTH OF KNOWLEDGE FREES THE TEACHER

Strong content knowledge is not an optional extra, it's our responsibility as mathematics teachers. But it also provides us with freedom. A teacher with command of the mathematics can teach rather than manage. They can listen to a student's question without anxiety about what's coming next. They can improvise examples and connect ideas in real time.

Without that command, teaching becomes cautious and conversations with students feel constrained. The energy shifts from exploring ideas to staying one step ahead. The uncomfortable truth is that it is simply not good enough to be one textbook chapter ahead of the students. Students can sense it. They trust teachers who think aloud with authority and curiosity who can say, 'Let's see why that works,' and then genuinely unpack it. That confidence doesn't come from performance; it comes from depth.

THE PATH BACK TO COMMAND

Rebuilding mathematical command isn't as daunting as it sounds. Teachers already possess the scaffolding; they simply need to reconnect the pieces. What works best:

- Structured revisiting of key ideas. Focused sessions on the major conceptual shifts, (e.g. functions, calculus, statistics), help teachers rebuild depth efficiently.
- Mapping progression across year levels. Seeing how a Year 9 skill matures into a Unit 3 concept clarifies both ends of the learning journey.
- Collaborative problem solving. Working through real VCE-style problems with peers reignites genuine mathematical thinking.
- Learning from experienced mentors. Watching seasoned VCE teachers model their reasoning helps bridge the gap between understanding and classroom application.

These practices don't just transfer knowledge they restore confidence grounded in genuine comprehension.

WHEN PROFESSIONAL LEARNING BECOMES A BRIDGE

This is the philosophy behind the MAV's Build Me Up (VCE) program: a structured pathway that helps teachers rebuild content strength while staying connected to real classroom practice.

Across two in-person workshops and a suite of online sessions, participants revisit core mathematical ideas, examine how topics interlock across the Study Design, and experience the subject as learners again. They rediscover not just how to teach VCE mathematics, but how to think it.

The program doesn't reduce VCE to checklists. It cultivates confidence through genuine understanding the kind that lasts beyond a single course or year level.

TEACHING BEYOND COMFORT

When teachers step beyond their comfort zone into VCE, they model intellectual courage. They show students what it means to persist through uncertainty to move from confusion to clarity.

And something else happens, too. Teachers who re-engage deeply with the mathematics often rediscover its beauty (e.g. the elegance of a proof, the symmetry in a graph, the satisfaction of a clean solution). The subject becomes alive again, not just assessable. That rediscovery reminds teachers why they started doing this work in the first place.

STEPPING FORWARD

So, when that tap on the shoulder comes 'Would you be willing to take on VCE next year?' maybe the right answer isn't 'I'm not ready,' but 'I'm ready to learn.' The gap is usually smaller than it looks. And once you start the climb, it doesn't just build knowledge, it shifts how you see yourself as a teacher.

BUILDING WHOLE SCHOOL CHANGE

Di Liddell, Education manager, MAV

CONT. FROM PAGE 1.

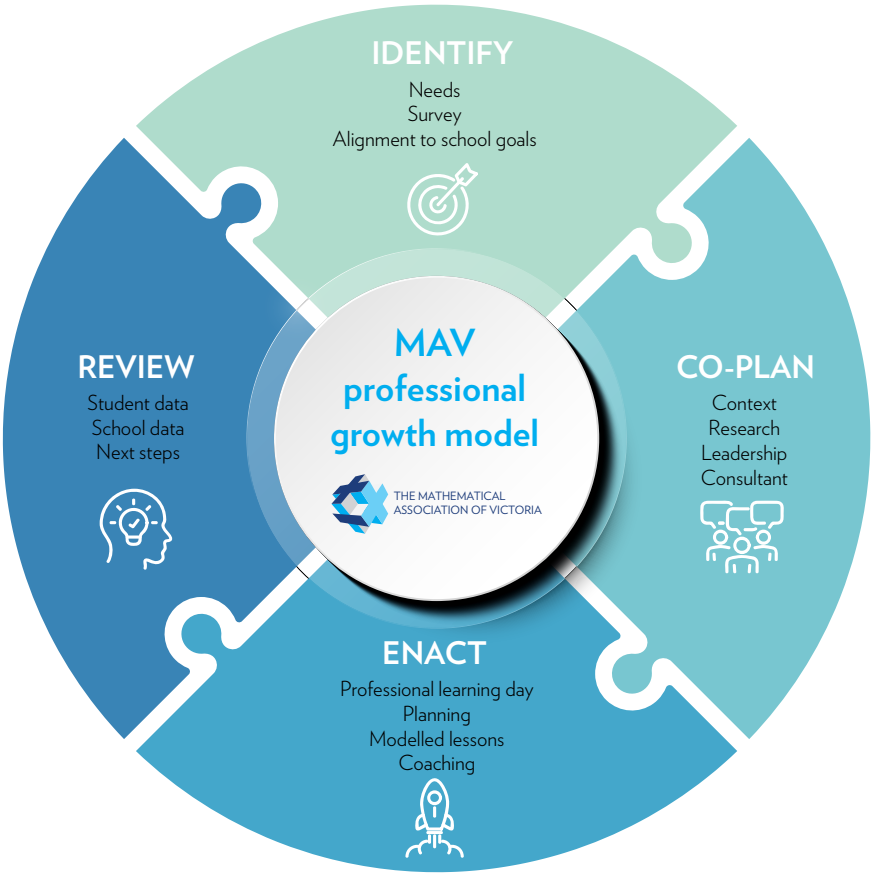


Figure 1. MAV's Professional Growth Model.

THE MAV PROFESSIONAL GROWTH MODEL

The Professional Growth Model is a collaborative and iterative framework that supports schools in identifying, designing, implementing, and reviewing professional learning initiatives aligned to their specific needs. The model comprises four interconnected phases: Identify, Co-Plan, Enact, and Review. Each phase is grounded in professional dialogue, contextual data, and research-informed practice.

Phase 1: Identify
Establishing a clear picture of practice

This phase focuses on uncovering existing strengths and determining areas for growth. This begins with consultation between MAV and school leadership to contextualise the school's current practices and priorities in mathematics education. School leaders complete the MAV discovery survey, a comprehensive diagnostic tool, that provides insight into current pedagogical practices and guides the identification of professional learning goals.

Further insights are gathered through classroom observations, learning walks, and a review of existing planning documents. This process ensures that the professional learning plan is both relevant and strategically aligned with broader departmental and system priorities, including the AAMT Position Paper and Department of Education initiatives, such as the Victorian Teaching and Learning Model (VTLM 2.0).

Key actions

- Conduct learning walks and classroom observations.
- Complete the MAV discovery survey to inform goal setting.
- Review current data, planning documentation, and strategic plans.
- Align findings with system-wide frameworks and priorities.

This diagnostic stage ensures that school goals are evidence-informed and responsive to the lived realities of teachers and students.

Phase 2: Co-plan
Designing a strategic and collaborative response

Once goals are clearly defined, the co-plan phase supports schools to collaboratively design a bespoke professional learning program. MAV consultants work closely with leadership teams to ensure the program aligns with identified priorities and responds to the specific needs of staff and students.

Relevant academic literature is drawn upon to support professional conversations around effective pedagogical approaches and mathematics content knowledge. These discussions help create a shared understanding of what effective mathematics teaching looks like, and how it can be achieved in the school's unique context.

The expertise and experience of MAV's external consultant team is central to this phase. External consultants are currently practising educators and school leaders from across sectors and regions, selected

to match the needs and context of each school. Where appropriate, MAV also draws upon mathematics education experts to further strengthen the professional learning program.

Key actions

- Define long-term and short-term professional learning goals.
- Align professional learning with academic research and evidence-based practice.
- Identify key staff as agents of change.
- Consider school context and readiness to tailor delivery methods.

Co-designing with schools ensures that professional learning is purposeful, coherent, and strategically integrated into the broader goals of the school.

Phase 3: Enact
Implementing targeted professional learning

In this phase, the professional learning plan moves into implementation. Delivery is flexible and differentiated, with schools choosing from a range of approaches:

- Modelled mathematics instruction.
- In-class coaching and mentoring.
- Whole-staff professional learning days.
- Targeted support for professional learning teams (PLTs).

As implementation progresses, MAV consultants adjust their level of support to build internal capacity, particularly with numeracy leaders enabling schools to sustain professional learning independently over time.

Key actions

- Determine the most effective delivery model(s).
- Embed learning through coaching, collaborative inquiry, and modelling.
- Identify and differentiate support for participants across roles and experience levels.

This phase focuses on translating planning into practice, embedding professional learning within the rhythms and routines of teaching.

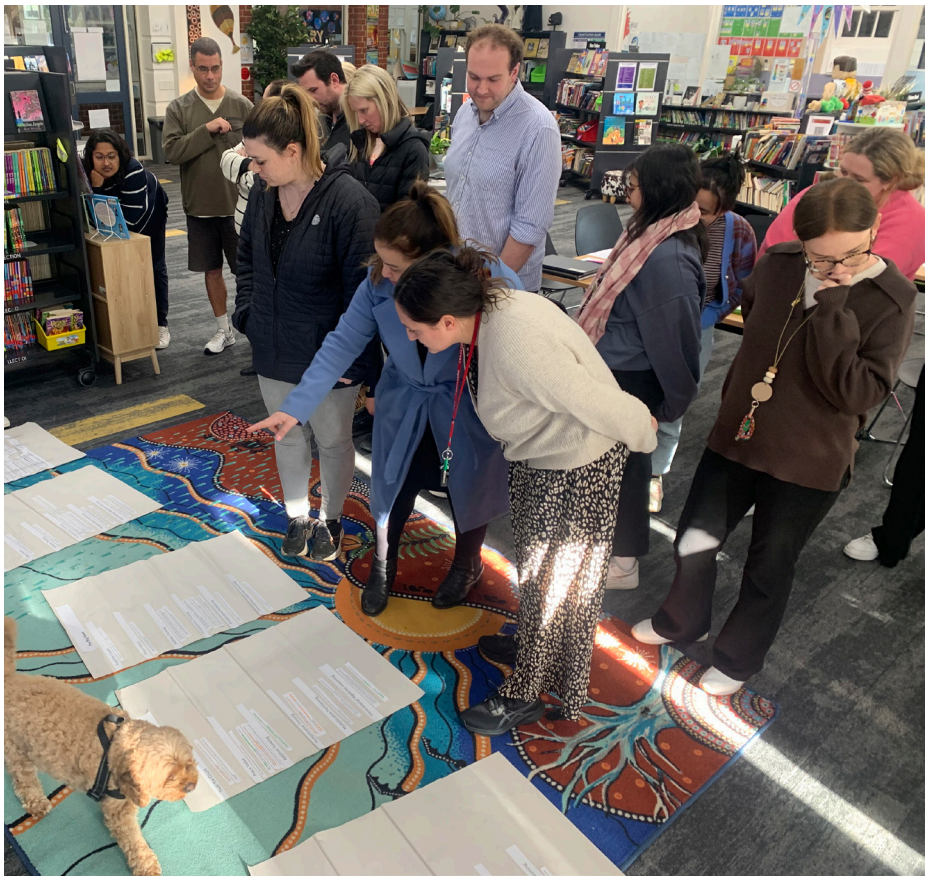


Figure 2. Hands-on planning connecting mathematical 'Big Ideas' with curriculum outcomes.

Phase 4: Review
Evaluating impact and planning for sustainability

This phase centres on evaluating the effectiveness of the professional learning and identifying next steps. MAV works alongside school leaders to examine student outcomes, teaching practices, and school-wide data to assess progress against the original goals. These insights inform the refinement of future professional learning initiatives and foster a culture of continuous improvement.

Key actions

- Evaluate impact using data and defined indicators of success.
- Celebrate achievements and identify areas for further development.
- Plan for sustained improvement through ongoing cycles of learning.

This reflective process ensures that professional learning remains relevant, responsive, and impactful over time.

LEADING PROFESSIONAL LEARNING WITH PURPOSE

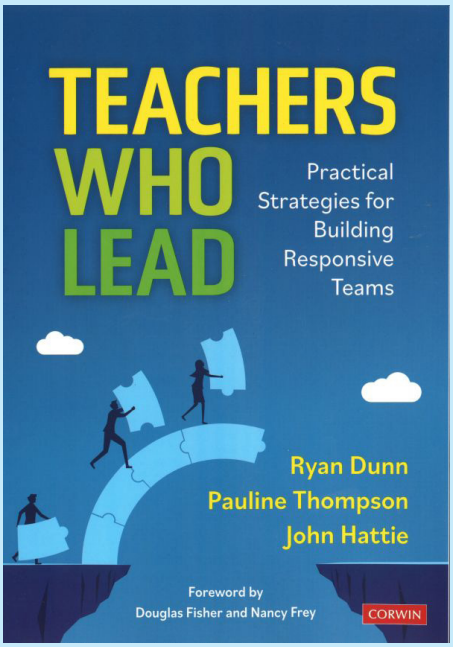
Effective professional learning is not transactional, but rather it is transformative. It relies on leadership, trust, collaboration, and evidence-informed practice. MAV's Professional Growth Model offers a structured yet flexible framework that enables schools to design and deliver professional learning aligned to their unique context and priorities.

As teacher-leaders, educators are increasingly called upon to shape not only student outcomes, but the professional growth of their colleagues. With strategic tools, trusted partnerships, and clear purpose, schools can cultivate a living culture of professional growth, where mathematics teaching continually evolves to meet the needs of every learner.

If this article inspires you to consider whole school change in partnership with MAV, reach out to Di Liddell for a chat, dliddell@mav.vic.edu.au.

TEACHERS WHO LEAD

Renee Ladner, Education consultant, MAV



BOOK REVIEW TEACHERS WHO LEAD: PRACTICAL STRATEGIES FOR BUILDING RESPONSIVE TEAMS

In *Teachers Who Lead*, Ryan Dunn, Pauline Thompson and John Hattie provide a practical and research-informed guide for educators navigating the space between classroom teaching and formal leadership roles. This compact yet impactful text speaks directly to teacher leaders: those coordinating teams, leading curriculum initiatives, or driving improvement efforts within their schools.

Structured over five chapters, the book outlines strategies to support collaborative professional cultures and strengthen collective efficacy, all while enhancing the consistency and quality of student learning. Dunn, Thompson and Hattie provide tools and protocols for identifying problems of practice, modelling effective instruction, and building shared resources that support improvement in both pedagogy and outcomes.

Chapter one introduces practical frameworks such as fishbone diagrams and the '5 Why's' process to support inquiry-based leadership. It starts the book in a strong way, encouraging a deep dive of why certain elements in schools may or may not be working well.

I recently used this example with leaders, with the example of 'our students struggle with problem solving in mathematics'

- Why? They can't comprehend the worded problems.
- Why? They aren't sure of particular words or phrases.
- Why? We teach the mathematical vocabulary, perhaps not as explicitly as we should.
- Why? We do not have a common understanding of the vocabulary.
- Why? We are not planning for explicit teaching of mathematical vocabulary and checking for understanding, using Victorian or Australian based resources to assist us.

This framework assists leaders get to the bottom level to then work up to assist the bigger issue at hand. Later chapters build on this by exploring how teacher leaders can facilitate professional dialogue, lead by example in the classroom, and co-design curriculum materials aligned to shared goals. The emphasis is not on leader position but on influence through trust, modelling, and a deep understanding of student learning.

With the full implementation of Victorian Mathematics Curriculum V 2.0 in place, the focus on co-constructed curriculum planning, explicit modelling of teaching strategies, and diagnostic problem-solving aligns closely with effective numeracy leadership practices. It provides a helpful structure for leading peer learning, coordinating resource development, and building capacity across teams to respond to common challenges such as conceptual gaps and a disparity in mathematics content knowledge across teams.

Each chapter includes reflection questions and planning prompts, encouraging readers to contextualise strategies for their own settings. The book's accessibility makes it ideal for use in professional learning teams, leadership meetings, or teacher-led communities of practice.

While primarily written for an Australian audience, the principles and practices described are broadly applicable.

Some terminology and examples reflect State system structures, but the core ideas translate well across diverse educational contexts. The emphasis on agency, trust, and adaptive expertise is particularly resonant for schools committed to teacher-led improvement.

Teachers Who Lead reinforces the idea that leadership is a practice, not a position – I found this grounding. It provides a thoughtful balance of theory and action, offering tools to help teacher leaders think critically about their role and lead with impact. For mathematics leaders in schools and classrooms, this book provides a valuable scaffold for building responsive teams focused on improving student learning. After all, we are there to have the most influence in student learning, why not strengthen it together.

This book is recommended for:

- Classroom teachers
- Numeracy leaders and mathematics coordinators
- Instructional coaches and learning specialists
- Teachers involved in curriculum development or peer mentoring
- School leaders supporting middle leadership capacity
- Education consultants working with leadership teams and teachers.

Teachers Who Lead is available from the MAVshop. Remember, MAV members get a discount on all stock in the shop. www.mav.vic.edu.au/mav-shop.

2026 VCE CONFERENCES

Head into 2026 VCE mathematics feeling prepared, unpack the 2025 exams, gather teaching strategies and insights. If you are a VCE mathematics teacher - you won't find a better event.

General, Methods, Specialist, Foundation, VM Numeracy and CAS.

UNMISSABLE CONTENT

- Learn from experienced teachers across all VCE mathematics subjects.
- Sessions devoted to SACs starters for all VCE mathematics subjects.
- Sessions on analysing last year's exams and the areas where students struggled most.
- Hear from TI-Nspire and Casio experts.
- Complimentary year long access to our learning management system with all resources, slides and recorded sessions from the event.

'The day covered everything I needed to know - it gave me exam insights that I couldn't get anywhere else.'
- 2025 participant

LOCATIONS AROUND VICTORIA

The conferences will be held in Term 1 2026. Join us at the location closest to you:

- Melbourne (RMIT University, city campus), 13 February 2026.
- Bendigo, 13 March 2026.
- Moe, 27 March 2026.

REGISTER NOW: WWW.MAV.VIC.EDU.AU

THE MATHEMATICAL ASSOCIATION OF VICTORIA

THE IMPORTANCE OF ANTICIPATION

Brendan Hodge, Learning specialist, Orchard Park Primary School and Chris Terlich, Learning specialist, Inverloch Kongwak Primary Schools

THE IMPORTANCE OF ANTICIPATION IN MATHS LESSON PREPARATION

Effective mathematics teaching requires more than simply delivering content from the curriculum, it requires careful anticipation of what students will need, what challenges they might face, and how learning can be best supported. The anticipation phase of lesson preparation plays a critical role in ensuring that lessons are purposeful, responsive, and engaging. Both the Inverloch Kongwak Primary Schools' (IKPS) maths instructional model (Figure 1.) and the Orchard Park Primary School (OPPS) instructional model highlight the value of anticipation as a foundation for quality teaching. The Victorian Teaching and Learning Model 2.0 (VTLM2.0) reinforces how deliberate planning allows teachers to maximise classroom learning opportunities.

ANTICIPATION AS THE FOUNDATION OF TEACHING

At IKPS, anticipation involves teachers having rich discussions about the content to be delivered, aligning learning with the Victorian Curriculum, and planning lesson sequences that skills build logically on prior knowledge and experiences. Teachers are expected to identify enablers (supports for students who need scaffolding) and extenders (challenges for students ready to move ahead). This forward-thinking ensures that all student are appropriately stretched and can make progress.

The OPPS model similarly emphasises the anticipation stage as a time to plan with clarity. It asks teachers to reflect on the learning intention, predict possible student misconceptions, and prepare resources including questions that will drive deeper thinking connection and mastery. Both models emphasise the importance of explicitly planning for evidence of learning and ensuring vocabulary is identified and intentionally introduced.

In essence, anticipation is not just about 'what will be taught' but also about 'how it will be learned.' By predicting stumbling blocks and designing supports in advance, teachers create smoother learning pathways for students.

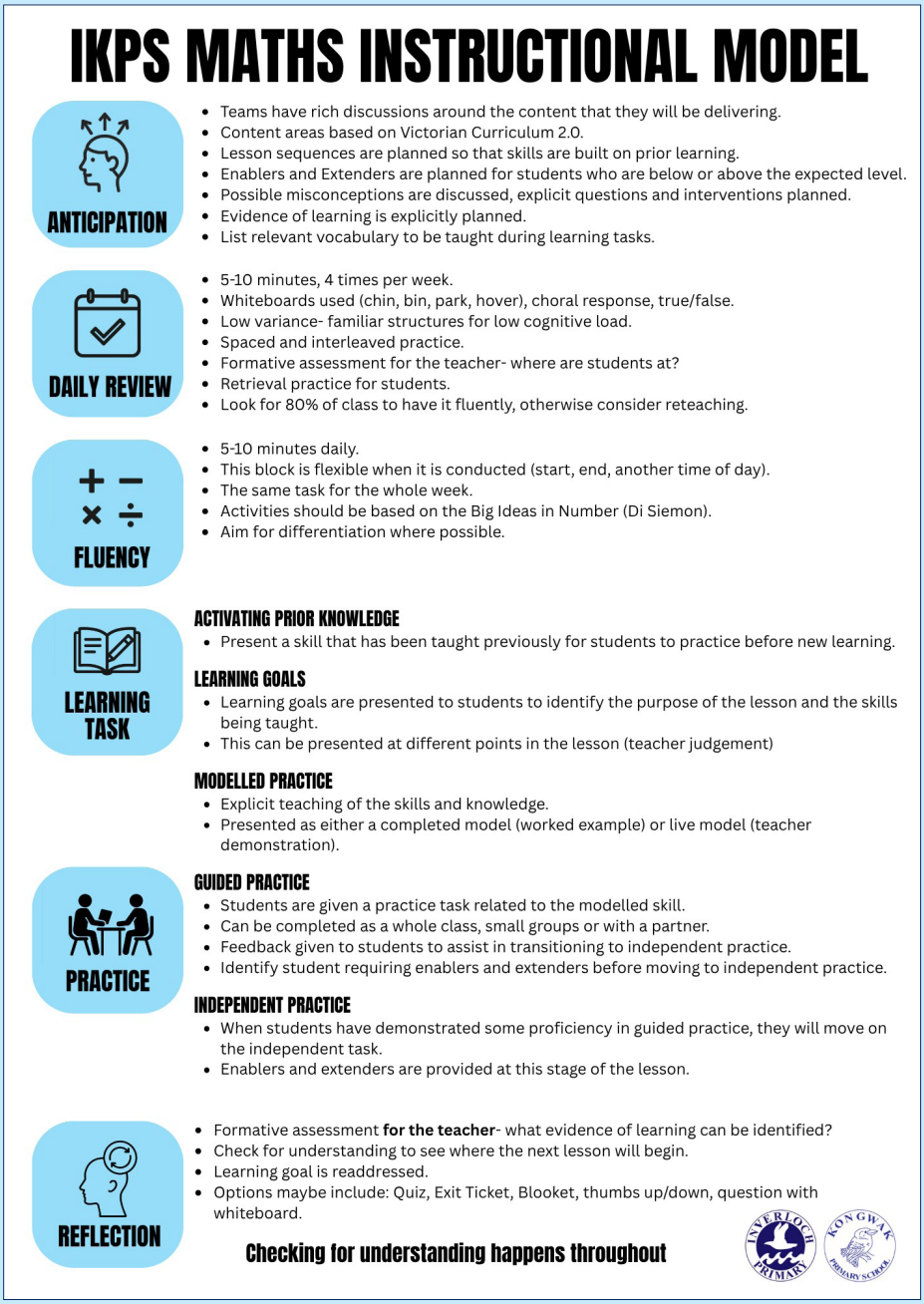


Figure 1. Inverloch Kongwak Primary Schools' mathematics instructional model.

This also strengthens teacher content knowledge and pedagogical content knowledge, especially for inexperienced or less confident teachers of maths.

BUILDING ON PRIOR KNOWLEDGE

A central idea in both instructional models is that effective maths learning must connect with what students already know. Anticipation requires teachers to consider the knowledge students bring to the lesson.

This allows teachers to design entry points that activate prior knowledge and avoid overwhelming students with disconnected or abstract tasks.

Consider watching this video (www.youtube.com/watch?v=E0LfMsZsoHI&t=16s) to see this principle echoed. It emphasises that teachers should deeply understand the content themselves and map how each new idea links to previous concept/s. When a teacher anticipates where today's lesson fits in the broader learning journey, they can better guide students through incremental progression rather than leaving them to make leaps on their own.

ANTICIPATING MISCONCEPTIONS

Mathematics is a subject where misconceptions are common and, if left unaddressed, can hinder future learning. For example, students might misapply whole number reasoning when working with fractions including decimals.

During the anticipation phase, teachers identify likely misconceptions and prepare targeted questions or tasks to surface and resolve them. This proactive stance contrasts with a reactive approach where teachers only respond once misconceptions have already taken hold. By anticipating them in advance, teachers can embed probing questions and scaffolds directly into the lesson.

CREATING CONSISTENCY

Another benefit of anticipation is consistency across the teaching team. The IKPS model highlights the importance of 'rich discussions' between teachers before lessons are taught. This ensures consistency in instructional strategies, vocabulary, and expectations across classrooms. Such collaborative anticipation prevents disparities in learning opportunities and promotes equity for all students regardless of their classroom.

Similarly, we believe that intellectual preparation is not an individual activity alone but something that can be enhanced by collaboration. When teachers collectively anticipate difficulties and opportunities, they pool expertise and raise the quality of teaching across a whole school and appropriately challenge all learners.

LINKING ANTICIPATION TO ASSESSMENT

Another vital role of anticipation is its connection to assessment. Both instructional models emphasise the need to plan for how evidence of learning will be gathered during a lesson.

Anticipating what student work or responses should look like allows teachers to prepare exit tickets, checks for understanding, and other formative assessment prompts in advance. This ensures assessment is not an afterthought but an integrated part of each component of the learning cycle.

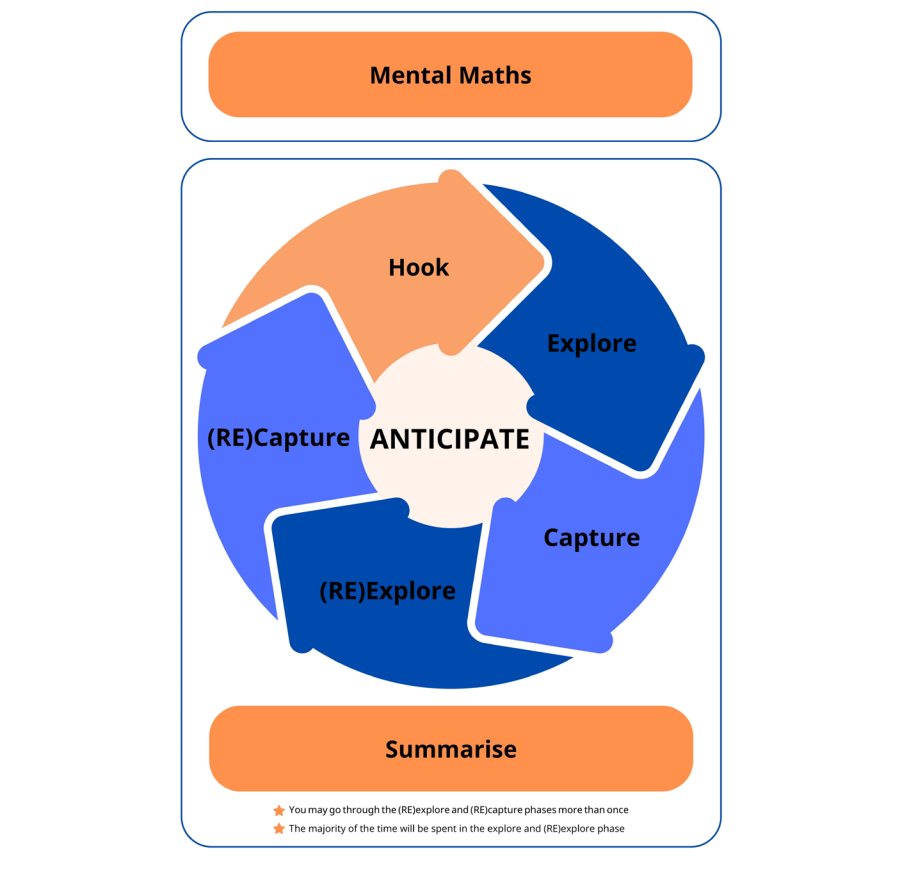


Figure 2. The anticipation phase is central to OPPS' mathematics instructional model.

By anticipating evidence of learning, teachers can make better instructional decisions in the moment, whether to reteach, extend, or consolidate the learning.

CONCLUSION

The anticipation phase of lesson preparation is the cornerstone of effective mathematics teaching. It provides clarity of purpose, prepares for student needs, addresses misconceptions, and ensures equity through coherent and differentiated planning. Insights from both the IKPS and OPPS instructional models, supported by external sources on intellectual preparation, affirm that anticipation is not an optional extra but an essential practice for effective teaching.

When teachers invest time in anticipating lessons, they create classrooms where learning is intentional rather than incidental, where challenges are expected and planned for, and where every student has the opportunity to succeed in mathematics.

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MAV consultants can support your school to embed the anticipation phase effectively, contact Renee Ladner, rladner@mav.vic.edu.au.

MATHEMATICS IN LUNAR CALENDARS

Leonie Anstey, Education leader, MAV

Figure 1. One example of a lunar calendar showing zodiac symbols.

LUNAR CALENDARS AND THE MATHEMATICS OF THE ZODIAC

The Chinese and Vietnamese lunar calendars offer a rich opportunity to explore mathematics in culturally meaningful ways. With 2026 marking the Year of the Fire Horse, teachers can use this moment to connect mathematics and numeracy using pattern recognition, and understanding calendars linked to real-world traditions.

MATHEMATICAL CONCEPTS IN THE LUNAR ZODIAC

The zodiac cycle is based on a 12-year repeating pattern, each year represented by an animal. Paired with one of five elements (Wood, Fire, Earth, Metal, Water), creating a 60-year cycle when combined.
This structure introduces:

- **Modular arithmetic:** Students can explore how the cycle repeats every 12 or 60 years.
- **Pattern recognition:** Identifying sequences and predicting future zodiac signs.
- **Data handling:** Creating timelines, bar graphs, or pie charts to represent zodiac distributions in a class or family.

TIME ZONES AND CALENDAR VARIATIONS

Although many Asian countries celebrate Lunar New Year, the exact date can differ due to time zones and local lunar observations.

WHY LUNAR NEW YEAR DATES DIFFER

Even though countries like China, Vietnam, and Korea use lunar calendars, the start date of Lunar New Year can differ slightly. This is due to:

- **Time zones:** The lunar calendar is based on the new moon, but the exact moment of the new moon depends on local time. For example, if the new moon occurs at 11pm in Beijing, it might already be past midnight in Hanoi or Seoul, pushing the celebration to the next day.
- **Cultural customs:** Some nations adjust the celebration to align with national holidays or traditions.

This variation provides a great opportunity to explore global time zones and how mathematics helps us measure time across the world.

This opens doors to:

- **Time zone maths:** Comparing local times across countries.
- **Astronomy links:** Understanding moon phases and how they affect calendar systems.
- **Critical thinking:** Discussing why cultural calendars differ and how maths helps us track time.

ENGAGING CLASSROOM ACTIVITIES

- **Zodiac mathematics wheel:** Create a rotating wheel showing the 12 animals and 5 elements. Students can calculate their zodiac sign and element based on birth year.

- **Timeline challenge:** Ask students to find the next Year of the Horse or Fire Horse using skip counting and multiplication.
- **Global New Year map:** Plot countries that celebrate Lunar New Year and compare celebration dates.

LINKS TO THE VICTORIAN MATHEMATICS CURRICULUM

Measurement and Geometry

Explore how lunar calendars vary across countries due to time zones and moon phases.

- Describe duration using months, weeks, days (Level F–2).
- Use calendars to identify dates and events (Level 3).
- Compare time zones and interpret time differences (Level 4).

Statistics and Probability

Students could survey classmates' zodiac signs, graph results, and compare distributions.

- Collect and interpret data (Level 3).
- Create displays using lists, tables, picture graphs and bar graphs (Level 4).
- Interpret and compare data representations (Level 5–6).

CROSS-CURRICULAR INTEGRATION

- **Cultural understanding:** Link mathematics to humanities and intercultural capability by exploring how different cultures use calendars and celebrate Lunar New Year.
- **Critical and creative thinking:** Encourage students to make predictions, identify patterns, and justify reasoning using zodiac cycles.

CONCLUSION

By integrating cultural traditions such as the Lunar New Year into mathematics lessons, teachers can foster curiosity, inclusivity, and deeper understanding of how math shapes our world. The Year of the Fire Horse is not just a celebration, it's a chance to gallop into meaningful learning.

Are you exploring cultural mathematics in your classroom? Share your story to inspire others.

Consider writing an article for our journals: *Prime Number* (primary) or *Vinculum* (secondary) to inspire others to connect mathematics with cultural understanding from your context.

Reach out to our editors at: primenumber@mav.vic.edu.au or vinculum@mav.vic.edu.au. Support is available throughout the publication process.

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

- This big picture has lots of little pictures and words inside it. Point to some of the little things. Draw your own big picture that includes lots of small pictures and shapes.
- I see the word STAR, it has 4 letters. I see the word NEW, it has 3 letters. Now, write your name and write the number of letters it has. Can you also write other words and write the number of letters for each one?
- The main colours I see in this picture are blue and yellow. I've made a pattern using blue and yellow counters. Can you copy my pattern and keep it going? Next, can you make your own pattern using blue and yellow counters?

- The artist created this artwork one day and a different artwork the next day. How many artworks did the artist paint altogether? Write the number that is the answer, then go on a number hunt to find as many other examples of that number as you can.
- If you needed a frame for this picture, what shape would the frame be? Draw that shape in lots of different sizes and colours. For example, you could draw a big red one, a small purple one, a small green one, and more!
- How many sides does this shape have? Look around and see if you can find other shapes with four sides, then have a go at drawing them.
- Imagine you're talking on the phone to someone who can't see the picture. What words or sentences would you use to tell them where the pink shoe is picture? You might use words like top, bottom, corner, middle, or next to, to help describe its location.
- The artists used three cans of yellow paint to make this picture. They used more blue paint cans than yellow. How many blue cans might they have used? Draw a picture to show the yellow and blue paint cans.

FOUNDATION - YEAR 2

- Create your own graffiti wall using at least four different shapes and some words that describe the shapes, such as sides, edges, and corners. Have fun drawing and colouring your shapes in many different ways!
- Ask 10 friends if they like this artwork. Make a graph to show how many said yes and how many said no. Then write some sentences to explain what you found out from your graph.
- The artist used 10 cans of paint to create this picture. Some cans cost $1 each, and others $2 each. How much could the artist have spent in total? Explore different combinations of $1 and $2 cans to find possible total costs.
- Imagine 15 people painted this picture together. Some were adults and some were children. How many might have been adults, and how many might have been children? Write a number sentence to match each possibility (for example: 7 + 8 = 15). How many combinations can you make?
- This painting is part of a set of three pictures. Each picture is a different shape, but all of them have four sides. In each shape, at least two sides are the same length. What might the other two shapes look like? Draw some shapes that could be part of the set.
- I found this picture so interesting that I spent half an hour looking at it in the art gallery, noticing all the details. What time might I have arrived at the picture, and what time might I have left? Try coming up with a few different possibilities. Write the different possibilities in a table, with the headings 'arrival time' and 'leaving time'.
- The artist was paid $5 for every person who visited the gallery. On Saturday, more than 10, but less than 50 people visited. How many people might have visited? How much would the artist have earned for each of those amounts of people? Show at least five different possibilities, and record your answers in a table.

YEARS 3 - 6

- Can you find any examples of symmetry in this image? Circle where you see the symmetry and explain how you know it is symmetrical.
- If the area of this image is 450 cm^2, what could the length and width be? How many different combinations can you find that would give this area?
- Create your own artwork that includes examples of symmetry and transformation. Show at least one line of symmetry, and use transformations such as flips (reflections), slides (translations), or turns (rotations) in your design. Be ready to explain where the symmetry and transformations can be found in your artwork.
- The gallery entry price is $12 per adult and $7.50 per child. There is also a family ticket available for two adults and up to five children at a flat rate of $40. How much would it cost your family to visit using individual tickets? At what point does buying the family ticket become a better deal than purchasing individual tickets? Calculate the saving (or no saving) for families with 1, 2, 3, 4, and 5 children when choosing the family pass.
- When asked about the picture, people liked different things – the colours, the pictures, the word art, or the actual words used. It was found that:
  - More people liked the colours than the pictures.
  - Fewer people liked the actual words compared to all the other options combined.
  - The word BERLIN was liked by about the same number of people as the pictures.

  Can you draw a graph that might show these results? Be sure to: include all four categories (colours, pictures, word art, actual words), show the differences in how many people liked each one and, use labels and colours to make your graph clear and easy to understand.

YEARS 7 AND ABOVE

- If it took four people three hours to paint this image, how would the amount of time change depending on how many people were painting, assuming everyone works at the same rate? Describe at least five different possibilities, showing how the time taken would increase or decrease as the number of painters changes. How many people would be needed to complete the painting in just one hour?
- Pretend the sale price of the artwork was $1,565 in 2026. It is predicted that the value of the artwork will increase by 10% each year. What would the artwork be worth in 2027, 2030, 2035, and 2042? In which year would it reach three times its original value? Now imagine that instead of increasing, the value of the artwork decreases by 10% each year. Which year would the artwork be worth half of its original value?
- What do you think is a reasonable price to sell this painting for? Be sure to consider the cost of supplies, the time spent creating it, and the profit margin you want to make. Show all your calculations and explain how you determined your costs, profit margin, and final price.
- Work in a small group. Cut the image into rectangular pieces, give each person one piece. Each person needs to enlarge their piece by a scale factor of two, by drawing it. Then, put all the enlarged pieces together to create the new image. What do you notice? What's the same? What's different?

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.

LEADING CHANGE

Jayde Williams, Assistant principal, Milgate Primary School

LESSONS LEARNED FROM LEADING CHANGE IN MATHEMATICS

True change in mathematics begins not with a new strategy, but with a shared philosophy about how learners construct understanding through inquiry. Over the past few years, our school has worked to strengthen the teaching and learning of mathematics, drawing on research, expert guidance, and our own collective experience.

Along the way, we have learned that meaningful change in mathematics is not about programs or resources; it is about people, beliefs, and clarity of purpose. The journey has reminded us that the most powerful shifts come from creating the conditions where teachers think deeply, learn together, and act with confidence. Here are some of the key lessons we have learned about leading and sustaining change.

START WITH WHY: A SHARED VISION ANCHORS THE WORK

Every successful change begins with a compelling vision. It must articulate why mathematics matters and what kind of mathematical thinkers we want our students to become.

As an International Baccalaureate World School, our vision for mathematics is underpinned by the IB philosophy that education should foster inquiry, conceptual understanding, and lifelong learning. Building on this foundation, our staff identified what this means in practice for mathematics at our school. We agreed that our approach should reflect four core principles:

- Students need to think in order to learn.
- Positive mathematical identities are formed when each student has equitable access to mathematics.
- Units are informed by data, curriculum, and professional learning.
- Our role is to provide multiple experiences for students to construct conceptual understandings.

These principles became the touchstone for every decision across curriculum, assessment, professional learning, and resource allocation. When the 'why' is shared and visible, improvement feels coherent rather than chaotic. It also provides a framework for evaluating new priorities or initiatives. If something does not align with our 'why', cracks begin to form, staff feel fragmented, and energy becomes scattered.

Holding fast to a shared purpose allows us to adapt to change without losing direction. It reminds us that our role is not to chase every idea, but to ensure every action contributes meaningfully to our collective vision for mathematics learning.

ALIGN PRACTICE WITH CORE BELIEFS AND VALUES

Leading change in mathematics often means surfacing, and sometimes challenging, long-held beliefs about teaching and learning. Many of us were taught that mathematics is about right answers and remembered procedures rather than reasoning, noticing patterns, and making connections.

To explore these beliefs, we used the *Thinking Routine Tug of War*. Teachers considered prompts such as: 'I value remembering maths ideas, concepts, rules, or formulae' versus 'I value creating maths ideas, concepts, rules, or formulae.'

We discussed where each of us stood on the rope, recognising that it is not one or the other but a balance, and that the learning experiences we design communicate what we truly value. This reflection provoked powerful conversations. If we describe ourselves as an inquiry school, do our mathematics lessons reflect that? Do we want students to mimic problem-solving routines, or to develop deep understanding through noticing, reasoning, and making sense of mathematical relationships?

By making our beliefs visible, we could realign our practice with our values of curiosity, agency, and collaboration. It reminded us that culture change starts with shared understanding, not new materials.

CONNECT WITH EXPERTS BUT BUILD INTERNAL CAPACITY

Through online webinars and professional readings, we were fortunate to learn from respected mathematics educators such as Peter Sullivan, Dianne Siemon and Peter Liljedahl. Their research gave credibility to the changes we were making and helped teachers see the 'why' behind strategies like focusing on the Big Ideas, enabling prompts, and building thinking classrooms.

We also connected with MAV's educational consultants and were fortunate to work closely with Di Liddell, whose expertise helped us build capacity within our own context. Through professional learning, modelling, and reflective dialogue, she supported our teachers to strengthen their practice and develop shared understandings of effective mathematics instruction.

Rather than keeping this expertise centralised, we focused on building it in different pockets around the school. Teachers with developing strengths in particular areas were encouraged to share their knowledge, lead small groups, and open their classrooms for peer observation. Over time, this created a culture where teachers learned from one another and professional growth became collective rather than individual.

LEAD WITH CLARITY AND COMPASSION

We learned quickly that teachers are rarely resistant to change itself; they resist confusion, overload, and loss of efficacy.

So we communicated often and clearly:

- What are we changing?
- Why are we changing it?
- How will we be supported?
- How will we know it is working?

We learned to become intentional about pacing initiatives so staff did not feel swamped. We also focused on psychological safety, the permission to try, fail, and reflect without judgement. When teachers feel safe and supported, they take risks, share missteps, and learn faster.

USE DATA TO TELL A STORY, NOT TO KEEP SCORE

Data was an important part of our improvement journey, but only when used as a tool for learning rather than accountability.

We used the *Assessment for Common Misunderstandings*, student work samples, and classroom observations to explore how students were thinking, not just what they could do.

When teams came together to discuss misconceptions or analyse samples of reasoning, the conversation shifted from 'How many got it right?' to 'What does this tell us about how students understand number?' That subtle but crucial change turned data into dialogue, and dialogue into insight.

CREATE STRUCTURES FOR COLLABORATION AND REFLECTION

Change sticks when teachers have time and space to make sense of it together. We built collaboration into our timetable through regular PLCs, co-planning sessions, and inquiry cycles where teachers designed, trialled, and reflected on lessons.

Leaders participated as learners, visiting classrooms, co-teaching, and sharing reflections rather than evaluations. This visibility helped normalise professional learning as a collective process.

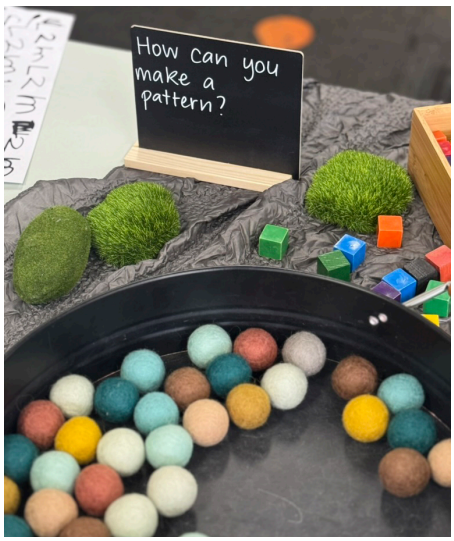

Figure 1. An example of an open-ended, play-based provocation supporting students to explore and create patterns.

HONOUR THE HUMAN SIDE OF CHANGE

We learned that people move through emotional stages of change: uncertainty, resistance, exploration, and commitment.

Figure 2. Teachers developing their mathematical pedagogical knowledge by engaging in the task first and anticipating student responses.

Recognising that helped us respond with empathy instead of frustration.

We learned to celebrate small wins: a student explaining their reasoning aloud, a class engaging in authentic mathematical discussion, or a teacher finding success with enabling and extending prompts. These moments built momentum and belief.

The most important leadership tool turned out not to be a framework or data set; it was gratitude. Taking time to notice effort and celebrate growth kept the culture positive and forward-looking.

FOCUS ON SUSTAINABILITY, NOT A QUICK FIX

Our goal was never to run a maths initiative. It was to build a sustained culture of mathematical thinking.

That meant embedding structures that would outlast leadership changes and new curriculum versions:

- A clear professional learning roadmap that sequences focus areas over time.
- Curriculum documentation that reflects agreed pedagogy and progression.
- Induction processes ensuring new staff understand our mathematics vision.
- Regular review cycles connecting teacher feedback, student outcomes, and next steps.

When improvement becomes part of the school's DNA, mathematics stops being a project and starts being a shared identity.

When all these elements align, mathematics stops being a subject that divides students into 'can' and 'cannot'. It becomes what it has always been, a human endeavour of curiosity, reasoning, and wonder.

ARE YOU MATHEMATICS ACTIVE?

Renee Ladner, Primary education consultant, MAV

Figure 1. Renee Ladner presents the Maths Active Schools Accreditation plaque to Siti Ali, Principal, and Adem Sahingoz, Numeracy Leader.

The Mathematical Association of Victoria (MAV) prides itself on working alongside schools to raise the profile and professional standards of mathematics education across the state.

Many Victorian schools go above and beyond to ensure that mathematics holds a high status within their school and wider community. Some of these schools remain unrecognised, while others reach out to MAV for support in becoming officially recognised as a Maths Active School.

Maths Active Schools have been part of MAV's work for over 14 years. When applying to become a Maths Active School, leadership teams reflect on aspects such as:

- Active engagement in targeted mathematics professional learning.
- Structures that maximise the learning and teaching of mathematics.
- Promotion of effective learning and teaching practices.
- Promotion of student-focused mathematics activities and enrichment.
- Use of assessment to inform teacher practice and enhance student outcomes.
- Demonstration of a commitment to valuing mathematics by engaging parents and the community.

INSIGHTS FROM ILIM COLLEGE

Ilim College, Doveton Campus, became a Maths Active School (MAS) in 2025. I met with Adem Sahingoz to gain his insight into becoming MAS accredited. I asked Adam about the accreditation process.

What motivated you to pursue Maths Active School status, and what do you hope it will bring to your learning community?

Our main motivation was to evaluate the effectiveness of our current mathematics practices and identify areas for further growth. We wanted to ensure that our programs were aligned with effective teaching practice and delivered meaningful outcomes for our students.

We hope that becoming a Maths Active School reinforces our commitment to making mathematics engaging, accessible and valued across our learning community.

What aspects of the Maths Active Schools application process supported school improvement?

When I reviewed the Maths Active Schools rubric, it was encouraging to see that we were already meeting many of the criteria. This motivated us to focus on strengthening the remaining areas through a more critical and targeted approach. For example, we identified that a financial literacy program had not yet been implemented, so we promptly booked an incursion to address this gap and look ahead to embedding it in a richer way.

The application process also prompted us to reflect on the structures that support our mathematics program, such as our professional learning plan, assessment processes and student enrichment opportunities, and evaluate how effectively these initiatives work together to improve student outcomes.

Were there any sections of the rubric that made you feel proud of your current practice, and did this prompt further reflection?

Yes, we felt a strong sense of pride in several areas, including:

- A clear mathematics vision and domain goals that underpin teaching and learning.
- A strong professional development plan promoting continuous teacher growth through internal workshops, collaborative learning and participation in external conferences such as MAV's Annual Conference.
- Our in-house data collection and analysis system that informs decision-making and drives teaching adjustments.
- A broad range of enrichment activities, including AMC, ICAS, chess tournaments and incursions, that engage students beyond the classroom.

The rubric also encouraged us to consider how we could enhance other areas. We identified opportunities to:

- Increase participation in external activities such as the Mathematical Talent Quest and MAV Games Days
- Host mathematics-focused information nights and parent workshops to showcase our approach to teaching and learning. While we currently share updates through SchoolBox and direct communication, these events would further strengthen community engagement.

How will being a Maths Active School impact your practice and leadership?

Being recognised as a MAV Maths Active School reinforces our collective responsibility to ensure mathematics remains a key strength and source of pride within our school. Moving forward, we will continue to provide enrichment for high-achieving students through accelerated programs while maintaining targeted support for learners who require additional assistance.

We will prioritise ongoing teacher development, encourage innovative and evidence-based practice, and strengthen partnerships with families.

Being a Maths Active School is not simply a title, it is an ethos that schools live by to ensure excellence in mathematics leadership, teaching and learning.

COMING IN 2026: MATHS ACTIVE TEACHER

Contributing to a positive mathematics culture in your school is something many educators wish to carry with them throughout their career, regardless of the school or community in which they work.

In 2026, MAV will offer a Mathematics Active Teacher accreditation, this offering is open to primary teachers, secondary mathematics and early years educators.

The Maths Active Teacher accreditation initiative recognises individual educators who demonstrate strong impact and leadership in mathematics education.

As part of the application process, applicants will reflect on their practice and those who become recognised as Maths Active Teachers are educators who:

- Actively engage in targeted mathematics professional learning.
- Establish structures that maximise the learning and teaching of mathematics.
- Promote effective learning and teaching practices.
- Use assessment to inform practice and improve student outcomes.
- Promote student-focused mathematics activities and enrichment.
- Demonstrate a commitment to valuing mathematics by engaging parents and the community.

INTERESTED?

If you are interested in becoming accredited as a Maths Active Teacher, or if you'd like to learn more about how to become a Mathematics Active School, please visit www.mav.vic.edu.au or email Renee Ladner, rladner@mav.vic.edu.au.

MATHS ACTIVE ACCREDITED SCHOOLS

Balcombe Grammar School

Berwick Fields Primary School

Cranbourne West Primary School

Croydon Hills Primary School

Deer Park North Primary School

Derrimut Primary School

East Bentleigh Primary School

Ilim College (Secondary), Doveton Campus

Ivanhoe Girls' Grammar School

Jells Park Primary School

John Monash Science School

Lumen Christi School – Point Cook

Malvern Central School

Melbourne Girls Grammar – Merton Hall

Milgate Primary School

Noble Park Secondary College

Penleigh and Essendon Grammar School

Sacre Coeur

Serpell Primary School

Springside West Secondary College

St Francis of Assisi School – Mill Park

Sunshine College – West Campus

Templestowe Park Primary School

Windsor Primary School

THE MATHEMATICAL ASSOCIATION OF VICTORIA | MATHS ACTIVE ACCREDITATION

MATHEMATICS POSITION STATEMENT

Penny Addison, Director, Numeracy, STEM and Digital Learning, Department of Education (Victoria)

VICTORIA'S VISION FOR MATHEMATICS TEACHING: UNPACKING THE MATHEMATICS POSITION STATEMENT (PART 2)

The Mathematics Position Statement outlines five key strategies to improve mathematics learning for every student. Part 1 (*The Common Denominator* Term 3, 2025) unpacked the first two strategies: implement the Victorian Teaching and Learning Model 2.0 (VTLM 2.0), and ensure students have time to develop mastery.

This article turns to the remaining three:

- Develop common classroom resources
- Address mathematics anxiety and build confidence
- Provide professional learning and support.

Together, these strategies create the conditions for sustained improvement, ensuring that teachers are well supported and that every student can succeed in mathematics.

WHY DO COMMON CLASSROOM RESOURCES MATTER?

The Mathematics Position Statement emphasises how important it is that all Victorian students experience high-quality mathematics teaching.

One of the most effective ways to strengthen mathematics teaching is by using common, high-quality, easy-to-use, classroom resources aligned to the VTLM 2.0. Schools that prioritise the development or curation of shared, high-quality curriculum materials create consistency, while also reducing the planning burden on individual teachers.

Instead of creating materials from scratch, teams collaboratively plan to select or adapt high-quality resources that meet student needs. These resources are not one-size-fits-all solutions. Instead, they provide a strong foundation for teachers to exercise professional judgment and thoughtful adaptation, while still promoting consistency across classrooms and as students' progress through school.

Figure 1. Collaborative planning in action.

For shared resources to make a real impact teachers need dedicated time to deeply understand the materials and consider how to use them most effectively. The use of common classroom resources can:

- Build teacher confidence and pedagogical content knowledge.
- Support high-quality planning, including intentional task design.
- Reduce individual teacher workload.
- Free up time for intellectual preparation and collaboration.
- Allow time for thoughtful adaptation to meet diverse student needs.
- Promote consistent and precise use of shared mathematical vocabulary.
- Build coherence in teaching across classrooms and year levels.
- Reduce variability in mathematics teaching.

In this way, common classroom resources become more than just time-savers, they become tools for professional growth, building self and collective efficacy to improve student learning.

Collaborative planning is part of the VTLM 2.0 and I encourage you to read the two newly released guides, which are available from the Arc platform:

- Lead a whole-school curriculum approach
- Develop and deliver quality curriculum materials.

The Victorian Lesson Plans (VLPs) are available to help you develop common high-quality mathematics teaching and learning programs. Hundreds of lessons, assessment, slide decks and other supporting resources can be accessed on arc.educationapps.vic.gov.au. For detailed guidance and practical examples on how you can use the VLPs effectively, visit the Evidence to Action page on the Arc platform. This is a new and growing hub for professional reading and advice around implementing the VTLM 2.0.

ADDRESSING MATHEMATICS ANXIETY

Mathematics anxiety remains a barrier to learning for many students. Mathematics anxiety significantly impacts student engagement, participation, and long-term confidence. The Mathematics Position Statement explicitly acknowledges this challenge. It emphasises how important it is for schools to foster supportive classroom environments where all students feel confident to try, make mistakes, learn from feedback and persist.

Insights from cognitive science and psychology show that anxiety consumes valuable working memory space, making it harder for students to process new mathematical information or retrieve prior knowledge to build on (AERO, 2023). Reducing anxiety is therefore not just about improving student wellbeing – it is essential for improving learning outcomes.

The Mathematics Position Statement encourages evidence-based practices that teachers can embed in every mathematics classroom. At the core of the Statement is a commitment to teaching in ways that:

- Promotes high levels of success.
- Develops deep mastery of foundational mathematical skills, so that students can confidently apply their knowledge without becoming overwhelmed.
- Supports all students via implementing multi-tiered systems of support.
- Fosters positive attitudes toward mathematics and reinforcing the belief that everyone is capable of learning.

Teachers and leaders have a powerful opportunity to positively shape students' beliefs about themselves as learners of mathematics. For example, you can reflect on your expectations and how you talk about learning, mistakes, challenge, and success. You can also consider the learning culture you foster, which can transform how students engage with mathematics.

STRENGTHENING TEACHER CAPABILITY AND CONFIDENCE

High-quality teaching is the strongest school-based factor that improves student outcomes. That is why the Mathematics Position Statement highlights the importance of building every teacher's confidence and capability through sustained professional learning, instructional leadership, and peer collaboration.

Many schools are embracing a sustained, whole-school approach to building teacher confidence and capability. This approach typically includes:

- Dedicated time for collaboration, allowing teachers to create, curate, adapt, use, reflect on, and refine high-quality instructional materials.
- Leadership support, with school leaders enabling teachers with strong curriculum expertise to share their practice, mentor colleagues, and provide coaching both in classrooms and during planning.
- School-wide structures and processes that support the ongoing review of student assessment and other data to identify what is and isn't working – and to guide necessary adaptations in teaching practice to improve student learning outcomes.

When teachers are supported to engage in collaborative, reflective, and well-facilitated professional learning, they are more likely to experiment with new instructional approaches, meet the diverse needs of their students, and strengthen their confidence and capability. Professional Learning Communities (PLCs) provide a valuable structure to support this growth.

Leaders play a key role in setting these structures up and ensuring that professional learning is prioritised and closely connected to the core work of curriculum design, planning, delivery, and assessment of student learning.

WHAT DOES THIS MEAN FOR ME?

The final three strategies in the Mathematics Position Statement focus on the things that make great teaching possible: access to shared resources, building student confidence, and supporting teacher professional learning. These aren't extras: they're drivers of improvement Whether you're teaching in the classroom, leading a team, or supporting others in your school, you can help make these strategies part of everyday practice.

Think about:

- Are we using high-quality resources across classrooms? How well are we working together to review and adapt them, so they have the highest possible impact for our students?
- What are we doing to help students feel more confident in their mathematics learning? How well are we creating a supportive environment and ensuring high success for all students?
- How are we supporting each other to grow as educators? Do we have enough time to plan together, share what's working, and support each other to grow in our understanding, practice and impact, individually and as a team?

By working together on these areas, schools can improve how mathematics is taught and learned and how well students engage when learning. They can also help support students' belief in their ability to succeed, and confidence to choose mathematics subjects and pathways in the future.

That's how we bring Victoria's vision for mathematics teaching to life: for every student, in every classroom.

REFERENCES AND FURTHER READING

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The Education State

Supporting Mathematics

Bring the Victorian Teaching and Learning Model 2.0 (VTLM 2.0) to life in the classroom with trusted, curriculum-aligned resources and tools from the Victorian Department of Education.

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SHIFTING MATHEMATICAL MINDSETS

Sarah Louise Nelson, Sarah Louise Consultancy

Figure 1. Children's engagement with mathematics is all around us, we just have to notice it.

A group of four-year-olds are sorting buttons on the mat. Some are counting, some are sorting, some are noticing patterns. For many educators, this moment can feel intimidating, but it's also where mathematics comes alive. Mathematics has long been a subject of polarising emotions.

For many early childhood (EC) educators, the mere mention of the word 'maths' evokes discomfort, anxiety, or even fear (Galeano et al., 2023). These emotional responses, often rooted in our own educational experiences, inevitably influence the way we approach mathematics with young children. Yet, we know that the EC years are a foundational time for shaping a child's attitude towards numeracy, as well as their belief in themselves as capable mathematical thinkers (AAMT & Early Childhood Australia, 2023).

This article explores the concept of mathematical mindset, the critical role EC educators play in shaping it, and how shifting our mindset can lead to joyful, playful, and deeply meaningful maths experiences in EC settings.

MY MATHS STORY

We all carry a maths story. For some, it's filled with praise and high achievement. For others, it's marked by frustration or shame. In my own case, I performed well with maths in primary school and was often praised for my high results. I was the type of student that could easily get the right answers and was both intrinsically and extrinsically encouraged to always be 'right'. Things changed in high school, however, when it became apparent that I lacked the ability to 'work things out'. I was so focused on getting answers right that I wasn't actually learning the 'how to' of mathematics. Quickly my confidence faded as I received lower and lower results, eventually landing myself in a remedial type of math class: a class that my peer group knew as 'dumb maths'.

After finishing high school and eventually heading to university to become an EC teacher, I dreaded my inevitable encounter with maths in my studies. When the numeracy unit rolled around on my timetable, I felt nervous. As I completed my readings and engaged in my classes, however, I started to see things a little differently. With a focus on play and effort, I was seeing more clearly the role that mathematics played in the EC classroom.

Over the unit I observed my stresses about times tables and calculating the area triangles dissipate. I was, almost suddenly, transported to a space of wondering, with and alongside children, about how much rain fell overnight, how tall a block tower could be before it fell over, and how many friends could easily sit around our circle mat. I still wasn't thinking of myself as a mathematician, but I was certainly seeing that there was more to maths than met the eye and that maybe, just maybe, there would be a place for it in my life after all. This was growth mindset, of a maths kind.

THE POWER OF MINDSET: CHANGING THE NARRATIVE

The concept of mindset was popularised by Carol Dweck (2017), who introduced the idea of fixed and growth mindsets. A fixed mindset suggests that abilities are innate and unchangeable, while a growth mindset

SHIFTING MATHEMATICAL MINDSETS

Sarah Louise Nelson, Sarah Louise Consultancy

CONT.

holds that skills and intelligence can develop through effort and learning. Dweck (2017) emphasises that early childhood is a crucial time for cultivating a growth mindset, particularly because this is when learners are still forming their sense of identity and capability. As EC educators, our language, our encouragement, and the environments we create play a vital role in this process. In our EC settings and practice, our own beliefs about mathematics influence not only our teaching but also how children view themselves as learners (Lucas, 2025). If we see ourselves as 'not good at maths', we may unknowingly limit the experiences we offer children. Conversely, when we see maths as something to explore, play with, and grow into, we extend that possibility to the children.

Growth mindset can also become a powerful indicator of genuine inclusion (Equity Diversity Inclusion, 2025). When EC educators hold a growth mindset not only for themselves but also for the children, they support every learner, regardless of starting point, to feel and be capable of mathematical success. This mindset is especially powerful for children who may face systemic barriers and inequity with traditional approaches to teaching and learning, or who have culturally and linguistically diverse learning needs. A growth maths mindset supports differentiation, adaptive scaffolding, and a greater appreciation for the diverse ways children think, feel, know and are (AAMT & ECA, 2023).

Rather than striving to be a 'maths expert', EC educators can instead position themselves as 'maths companions' (AERO, 2021). This subtle but powerful shift opens the door to vulnerability, creativity, and connection, and strengthens the growth mindset we hope to cultivate in children, and in ourselves. In practice this means being curious, present, and willing to explore alongside children. It involves asking questions like, 'I wonder what happens if we put these blocks together?' or 'How many spoons do we need for everyone?'. When we commit to mathematical companionship, we become co-learners rather than knowledge-holders, which is central to an authentic, inquiry-based approach to teaching (Edwards, Gandini, & Forman, 2012).

To support a shift in both mindset and practice, EC educators can begin with these practical strategies:

- Celebrate effort, not correctness: acknowledge children's (and colleague's) attempts, reasoning, and persistence, rather than focusing only on getting the 'right' answer.
- Normalise mistakes: mistakes are an essential part of learning. Saying things like, 'that didn't quite work, I wonder what else could we try?' helps build resilience and problem-solving skills.
- Use rich, open-ended questions: ask 'how' and 'why' questions instead of just 'what.' You can try, 'how did you know you had enough blocks for the height of the tower you wanted?' or 'why did you choose that size instead of one bigger or smaller?'
- Encourage collaboration: many mathematical ideas are better explored together. Collective problem-solving allows children to hear others' reasoning and extend their own thinking.
- Keep play central: as the Early Years Learning Framework (EYLF) highlights, play is a key context for learning (Australian Government Department of Education, 2022). Making maths playful ensures that it is joyful, meaningful, and relevant.

Having explored the power of mindset and some practical strategies, let's consider what this looks like in day-to-day practice.

EC MATHS IN THE EVERYDAY

Some educators may think mathematics only happens when children are sitting down, with flashcards or worksheets in front of them. In fact, maths is all around us. Mathematical thinking is naturally embedded in daily experiences and can be nurtured through play, routines, and transitions (Australian Education Research Organisation, 2023). These everyday moments provide rich opportunities for children to build confidence and understanding in meaningful, joyful way. Some of these moments include:

- Packing bags at the end of the day: conversations can involve commentary around volume, comparison, and spatial reasoning.
- Sorting buttons or beads: a playful opportunity to explore patterning and classification.
- Bush kinder, or on Country, walks: offer openings for counting, estimating distance, and comparing nature-based objects.
- Loose parts play using found and recycled materials: often these play provocations lead to dialogue about symmetry, sequencing, and seriation.
- Dramatic play set-ups: offer rich experimental moments with measurement, money handling, and problem-solving.

When early childhood educators recognise how mathematics is woven into daily play, routines, and transitions, it builds their confidence and supports children in developing positive mathematical dispositions such as curiosity, persistence, and inventiveness (AGDE, 2022).

RETURNING TO MY MATHS STORY

It's been almost 15 years since I completed that maths unit at university in my undergraduate studies. Since then, I've taught, I've led, and I've advocated across the EC sector, but this story has always held strong in my mind. It was defining.

Now, as a university lecturer teaching our next generation of EC teachers, I carry this story into my work. My focus is on making maths playful and helping pre-service teachers to develop the skills needed to identify those everyday maths moments in their curriculum. My approach is built on curiosity, flexibility, and playfulness to create the conditions for pre-service teachers to not only develop skills but also enjoy the learning journey and to see themselves differently.

I aim to affirm their capabilities and cultivate a love of learning that extends far beyond numbers and counting so that they can do the exact same thing with children in their own EC settings. One of my pre-service teachers captured this process perfectly: "you made maths feel like a normal, everyday part of life. I see it everywhere, at home, at the shops, not just at the kinder.

More importantly, I know now that it can be taught in a way that's meaningful and enjoyable, not just for me, but also for children.' That's the power of a shifted mathematical mindset.

As educators, we can choose to see ourselves not as reluctant mathematicians but as curious companions. By shifting our mindset, we open the door to playful, inclusive, and meaningful mathematics for every child.

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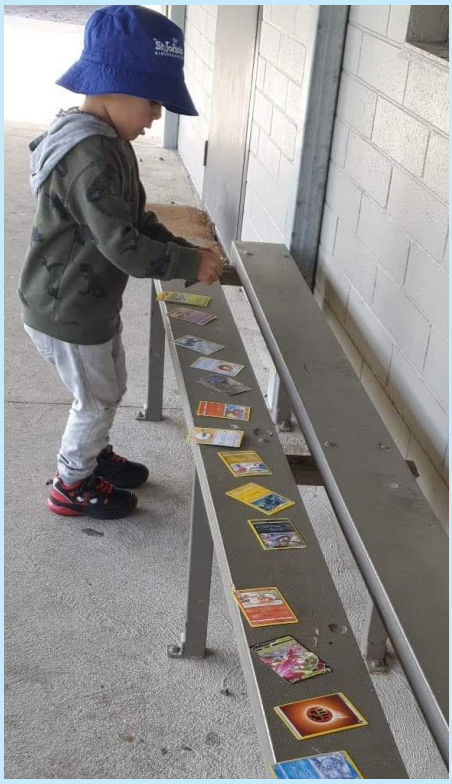

Figure 2. Mathematics can happen with simple resources.

ONE MINUTE: MICHAEL ROSENBROCK

I'M …

First and foremost, a maths and physics teacher. I work for myself as an education consultant with teachers, leaders, schools, systems and non-profits across Australia.

I STUDIED AEROSPACE ENGINEERING….

Because I was good at maths and physics, loved cars and aircraft, and wanted to do something really academically challenging. I loved the depth of intellectual challenge both mathematically and scientifically – whilst also appreciating the practical and design elements.

WORKING IN GERMANY…

Taught me the value of being a generalist who can work across domains and specialties. Many of my colleagues were highly specialised and they really valued the perspective that I shared, which came from a very broad knowledge base.

REGIONAL AND RURAL STUDENTS…

Frequently experience many kinds of educational disadvantage. In particular barriers to accessing opportunities due to distance, travel and just logistics! At the same time, there are many wonderful things about growing up in regional Australia, and it is important we build on these strengths when we work to address this disadvantage.

RIGHT NOW I'M…

Focussed on ways we can effectively translate models, theories and ideas into classroom practice. I often relate this to my engineering experience. There are at least three different models we can use to work out the lift generated by an aircraft wing. Which one we use depends on what we practically need – so we pick what is best for purpose in practice.

THE LINKS BETWEEN…

Theory and practice are full of detail, nuance and complexity. When we translate theory into practice, we need to be reflective and bring self-awareness. Do we understand the core components of the idea we are putting into practice? What existing examples can we draw on?

Have we veered off course and created lethal mutations? How can we adapt this to suit our context?

I ADMIRE…

School leaders that chart a long term course. Quick wins and shiny things only go so far. Sustainable change takes time, and impact isn't always simple to discern amongst the complexities of a school.

MY INTEREST IN…

Implementation means that I see it everywhere! It isn't simply the concern of leadership, but for everyone. Great ideas can be implemented poorly and end up a waste of time. And if implementation isn't sustainable, then even effective practices that were having an impact are likely to fade over time.

LESS IS MORE…

So much so that Dr Simon Breakspear and I wrote a book about it, *The Pruning Principle*. To teach is to have infinite possible good things to spend time on, but only finite actual time and resources. We have to prioritise, and saying no to good things can be very uncomfortable. But, if we do less, we can do better.

COLLABORATION IS…

Important – but also practically challenging to do at a deeper level. As teachers we spend a lot of our time doing the work of teaching classes, so we need to be very deliberate (and well supported) to make the space and time for deeper collaboration.

THE LAST BOOK I READ…

Dragon Keeper by Melbourne author Carole Wilkinson. We read it as a family because we love it so much! The entire series is a delight.

SUBJECT ASSOCIATIONS…

Matter because of their specialty. They are an important voice for the needs and unique value of their discipline area. The professional support they provide to teachers is invaluable. And they often do vital work in helping students to access great opportunities.

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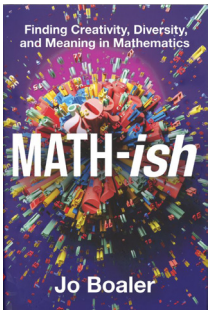

MATH-ISH

ALL

Jo Boaler shares new research on how embracing the concept of "math-ish"— a theory of mathematics as it exists in the real world — changes the way we think about mathematics, data, and ourselves. Jo guides us through seven principles that can radically reframe our relationship with maths:

- The power of mindset on learning
- Utilising a visual approach to maths
- The impact of physical movement and communication on understanding
- Understanding the value of an "ish" perspective - in mathematics and beyond
- The importance of connected and flexible knowledge
- New data on diverse teaching modes that work with different learning styles, not against them
- The value of diversity in learning mathematics — and beyond

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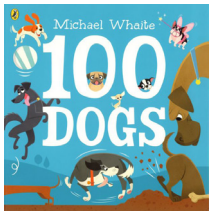

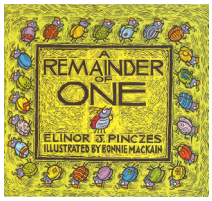

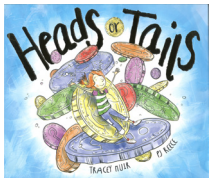

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- *One Hundred Hungry Ants* (F-4: number)
- *The Escape* (F-4: number, algebra, shape)
- *Remainder of One* (F-5: number, algebra, measurement)
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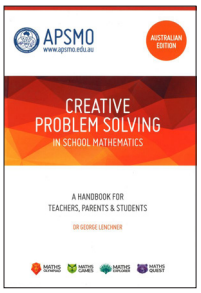

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4–8

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