THE MATHEMATICAL ASSOCIATION OF VICTORIA

THE COMMON DENOMINATOR 2/23

MOTIVATING STUDENTS

INSIDE

Marilyn Fleer and Anne Suryani – Monash University and Kelli Simmons – EdPartnerships

MOTIVATING STUDENTS IN MATHEMATICS THROUGH CONCEPTUAL PLAYWORLD AND REAL WORLD SITUATIONS

A 'common denominator' for all primary teachers is engaging student learners in mathematics. We know from Government reports that this is a major concern for Victoria (Department of Education and Training, 2016). It is not just an issue for Secondary teachers, it also matters in primary schools. It is a 'common denominator' across the mathematics education spectrum.

In the last issue of *Common Denominator*, Catherine Attard (2023) said that 'student engagement with mathematics has continued to challenge educators for many decades' (p. 1).

Continued on page 5

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

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FROM THE PRESIDENT

Kerryn Sandford

The year has definitely started and it feels every bit as busy as it was at the end of last year! The team at MAV have been hard at work preparing things for another year of high-quality professional learning, events and advocacy with a range of programs already in full swing and others soon to be published. This includes the pilot of our new community engagement platform about which you can learn more about on page 4.

One of the biggest pieces of news we have to share with you is that our CEO, Peter Saffin, finished up with MAV in March to take up a position at the Victorian Academy of Teaching and Leadership. Peter has been in the position of CEO at MAV for the past six years and in that time has led and been responsible for some significant improvements in the operations of MAV and the services that it provides to teachers across Victoria. During the COVID lockdowns, Peter's leadership ensured that the organisation not only kept functioning but was able to adapt and evolve to continue to provide the support and resources that were needed by so many.

On behalf of the Board, I would like to thank Peter for his many years of service to this organisation and for his strong leadership through what have been some very trying times. On a personal level, I have much appreciated Peter's support of mathematics education and the Board, and have come to rely on his quiet competence and initiative.

We will farewell Peter officially at our AGM in May and I encourage everyone to attend this event (details below). You can read Peter's reflections on his time at MAV on page 10.

I am delighted to welcome Jennifer Bowden to the role of CEO. Jen has worked for the MAV as a mathematics education consultant for a number of years and is well placed to lead MAV into its next phase. The Board is thrilled to have such a passionate educator and advocate for mathematics step into the role of CEO.

For leaders of mathematics and numeracy, I encourage you to investigate a recent resource published by the Department of Education titled, *Numeracy Improvement Guide for School Leaders*. This resource provides valuable advice about how to approach improving numeracy in schools as well as detailed guidance to the freely available resources that can help with this work. It is a great resource that collates and organises the many resources that are out there in a way that is digestible and meaningful. It's pitched at school leaders and middle leaders, I strongly encourage you to take a look.

MAV AGM

Notice is hereby given that the Annual General Meeting for The Mathematical Association of Victoria will take place on Tuesday 23 May 2023. Please arrive from 5pm for a 5.30pm start. The AGM will be held at The Huddle, North Melbourne Football Club. 204-206 Arden Street, North Melbourne. You are welcome to join online if preferred.

All members and interested parties welcome. Come and meet the MAV Board, Life members and special guests.

Agenda

- Welcome
- Minutes of previous meeting (Special General Meeting)
- Annual report including President's Report
- Financial reports
- Endorsement of Updated Constitution by Special Resolution
- Election of Directors if required, and announcement of appointed Directors
- Thank you to retiring Directors

Following the formalities, you are warmly welcome to stay for networking and tour of The Huddle facilities.

RSVPs close Monday 15 May, email Claire Embregts, cembregts@mav.vic.edu.au to RSVP. Claire can also provide proxy forms.

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
TI-Nspire use in VCE Mathematics courses with emphasis on the Mathematical Methods content	2/5/23 Virtual	VCE	Sanjeev Meston
Networks: Euler, Hamilton and maximum flow	3/5/23 Virtual	VCE	Jess Mount
Pseudocode	11/5/23 Virtual	VCE	David Rodgers
Casio Classpad use in VCE Mathematics courses with emphasis on the Methods and Specialist content	16/5/23 Virtual	10 - 12	Kevin McMenamin
Networks: Critical path analysis	17/5/23 Virtual	VCE	Jess Mount
MAV AGM	23/5/23	All	Various
MAV Regional conference	26/5/23	F - 12	Various
Tips and tricks for efficient use of CAS	31/5/23 Virtual	9 - 11	Danijela Draskovic
TI-Nspire use in VCE Mathematics courses with emphasis on the Specialist Mathematics content	1/6/23 Virtual	VCE	Trang Pham
Pseudocode	7/6/23 Virtual	VCE	David Rodgers
Primary maths conference	15/6/23 and 16/6/23	F - 6	Various

NEW MAV CEO

Jennifer Bowden has been appointed to the role of CEO of MAV. Jen has worked for MAV as an education consultant for 15 years and is a passionate advocate for mathematics education and a natural leader.

Jen's dedication to mathematics education extends beyond her work with MAV. She has contributed to the wider community as a speaker at national conferences, presenter of professional learning workshops, and writer of mathematics educational resources.

Jen's commitment to ongoing professional development has enabled her to stay at the forefront of the latest pedagogical approaches and to bring innovative ideas and strategies to her work with MAV.

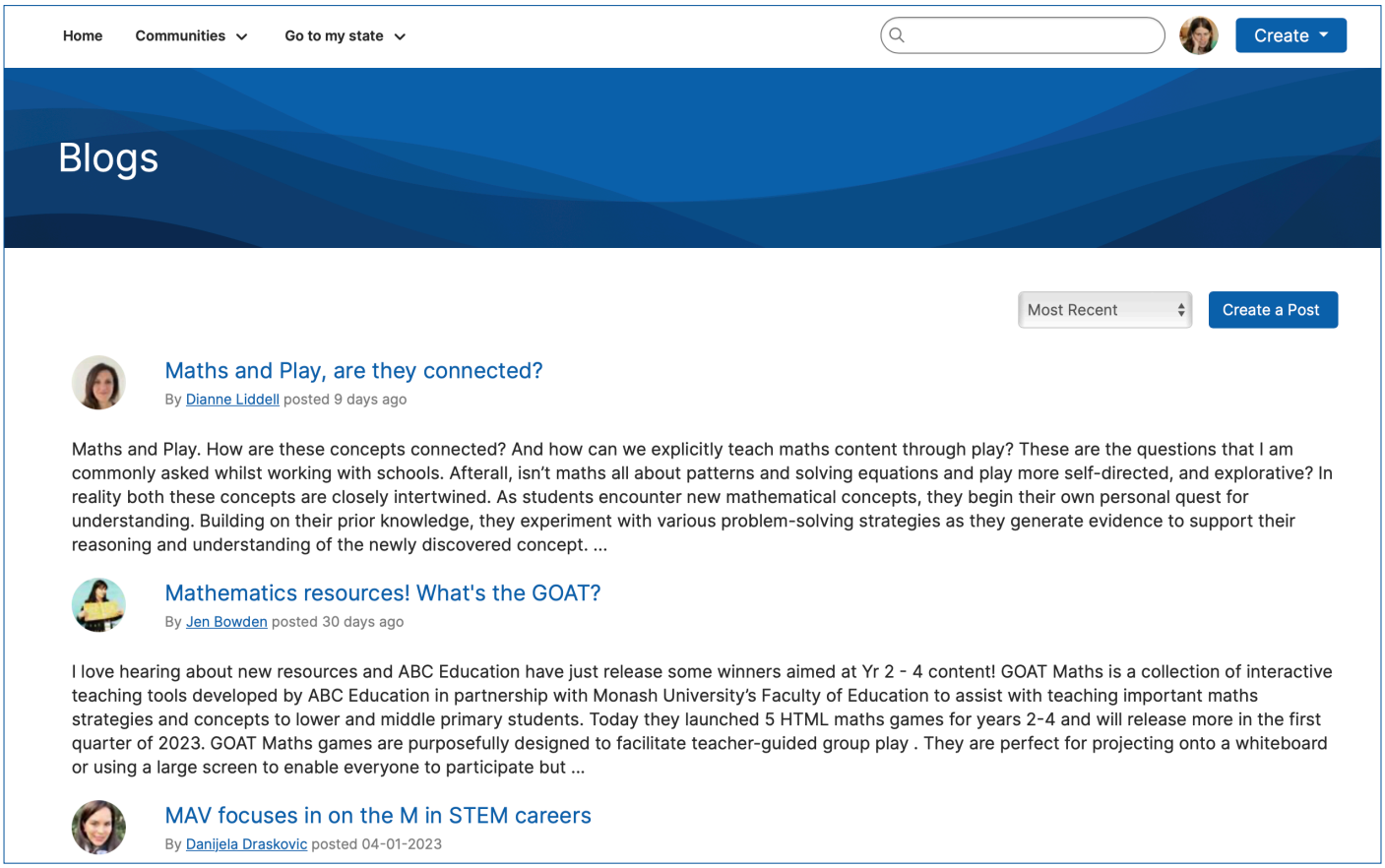
Jen has a proven track record of inspiring and empowering teachers; she has coached, mentored and guided consultants, teachers, and leaders to build teacher capacity, increase knowledge of curriculum content, and to develop better pedagogies to establish school-wide improvements in mathematics education.

As CEO, Jen looks forward to building further relationships with MAV members, stakeholders, partners, and the broader Victorian maths education community to further enhance the offerings of the MAV. She is committed to strengthening the MAV's mission of *Valuing Mathematics In Society* and ensuring the best quality teaching and learning opportunities are available to all Victorian students.

Jen's appointment as the CEO marks an exciting new chapter for MAV and the wider mathematics education community across Victoria. Her extensive experience, passion, and leadership skills position her well to lead MAV into the future.

YOUR MEMBER COMMUNITY

Claire Embregts – Community strategy manager, MAV



The new community includes many features that will appeal to mathematics educators.

If you're a maths educator in Victoria looking for a community to help you grow your skills and knowledge - you'll be happy to know that our new online maths community has been launched to our group of testers, making them our first members!

The MAV community has been designed with a specific goal: to provide a space where Victorian maths educators can come together and share ideas, resources, and strategies for teaching maths. The community platform offers a variety of features, such as discussion forums, resource sharing, professional development, and networking opportunities exclusively tailored to Victorian maths educators' needs, allowing them to connect and collaborate in a meaningful way.

One of the first threads posted in the online maths community is the *Introduce Yourself* thread, which has received lots of responses and positive feedback from members. The idea of the *Introduce Yourself* thread is to help break down the barriers between educators, enabling them to share their backgrounds, experience, and passions, thus adding to the community and allowing everyone to get to know each other.

MAV education consultants have been active in the community, posting introductions, responding to threads, welcoming new members, and adding regular blogs. As the community grows, there will be the opportunity to create specific groups catering to targeted needs and interests. For example, a community group focused on implementing the new 7-10 Victorian Curriculum or groups focused on all things STEM, coding, specialist maths, and rich tasks. Joining these groups allows for improved skills, knowledge, and contribution to the community.

Launching this online maths community is an exciting development for maths educators across Victoria, and we can't wait to see what the future holds for this new platform.

Once the testing phase is complete, we will add more maths educators to the community over the coming months.

So, if you'd love to connect with more like-minded maths educators and further improve your teaching skills, please head to our community membership page, and complete our expression of interest form.

We look forward to seeing you there!

To express your interest in joining our new community platform, head to www.mav.vic.edu.au/Membership/Community, or contact Claire Embregts, cembregts@mav.vic.edu.au.

MOTIVATING STUDENTS

Marilyn Fleer and Anne Suryani – Monash University Kelli Simmons – EdPartnerships

CONT. FROM PAGE 1.

She has recommended that we consider new strategies, programs, and ways of engaging the learner. She poignantly argues that in the process of 'covering the curriculum' and 'uncovering' what engages the learner, that we bring forward open-ended tasks, rich tasks, problem solving and investigations, inquiry-based learning and more. In reviewing this area, she argues that we must think about student engagement in mathematics as more than 'being on task' and to conceptualise the challenge as 'being in task'.

In this issue of *Common Denominator*, we build on this foundation and showcase examples of 'being in task' by sharing how teachers and leaders at Laburnum Primary School and researchers from Monash University came together in an educational experiment.

We wanted to see how imagination in mathematics and imagination in play could motivate students into wanting to solve the inquiry problems they encountered as they journeyed into role-playing within the narrative of an imaginary world of a storybook. We wanted to know if students in Year 6 would be interested and become motivated to role-play in an imagined corporate world of designing a city, setting up classroom companies and meeting regularly in the boardroom to discuss problems that needed mathematical solutions (www.youtube.com/watch?v=_Ca8AtzkYCQ).

We expected younger children to jump into the story of *Room on a Broom* to solve the problem of getting all the characters on the broom (moving to standard units) in Foundation. (www.youtube.com/watch?v=Az4SlmaDnuQ&t=12s).

We also thought Year 2 students would be able to imagine themselves as shape detectives carrying binoculars to signal their role, searching their environment for a lost puppy looking for clues.

But we didn't know if the Year 6 students would engage. Or how the Year 4's would feel on seeing their playground taped off, and signs put up to say, *Keep Out*, *Demolition about to commence*, *Proposed Car Park*. There was still time to put in community response by preparing a report to the School Council, using evidence

MONASH University

GROUP OF EIGHT AUSTRALIA

Planning a *Conceptual Playworld* in STEM (Fleer, 2022)
Monash PlayLab

Five Characteristics of a Conceptual Playworld to support imaginary play and Science, Technology, Engineering and Mathematics (STEM) thinking and learning (Fleer, 2022)

Pedagogical characteristics	Pedagogical practices that are planned	Conceptual PlayWorld in action
Selecting a story for the *Conceptual Playworld*	▪ Context of children ▪ Selecting a story that is enjoyable to children and adults ▪ Building empathy for the characters in the story ▪ A plot that lends itself to introducing a problem situation ▪ Being clear about the concept(s) and its relation to the story and play plot to be developed ▪ Adventures or journeys that spring from the plot (e.g., chapters)	▪
Designing a *Conceptual Playworld* space	▪ Finding a space in the classroom/centre/outdoor area suitable for an imaginary *Conceptual PlayWorld* of the story	▪

Figure 1. Excerpt from the planning proforma. This planning document from Conceptual PlayWorld was utilised in the second planning session. www.monash.edu/conceptual-playworld.

(statistics and representation of data) to push against the proposal.

The whole school took on the challenge of finding the ways that engaged learners in mathematics (www.youtube.com/watch?v=uqLOG4148L4).

As the teachers and students launched into a Conceptual PlayWorld (Foundation to Year 5) or RealWorld Scenarios (Year 6), the leadership said, 'I was just down in the Year 6 area, and the classrooms are buzzing' (Kathy, Assistant Principal). Chris (Year 6 teacher) said, 'I did a straw poll and asked my students 'Who likes learning mathematics like this?' and all the students' hands went up'. We collectively learned that the new way of teaching was '...not more work. It was different work'. Other realisations included:

- This is not just a project. It is more than that. (Kathy, Assistant Principal)
- This is not about setting up play and learning areas, it is much deeper. (Jacqui, Learning Specialist Year 4 teacher)
- We don't just do role-play and activities, we keep the mathematical concept up front in our conversations with the students and steer their mathematical thinking in a direction we planned - the learning pathways mingle, merge and circle back. (Kelli, Learning Specialist).
- The starting point is an authentic problem that the students want to solve so that the play can continue. (Marilyn, Monash Team Lead).

But to take the whole school there, Kelli, Marilyn, Anne, and the Monash team brought the teachers into a whole school professional learning session. Lots was happening via Zoom in the two locations: Monash University with Anne and her team and at Laburnum with Kelli and her team.

Together we planned a whole school professional learning in designing and implementing a Conceptual PlayWorld (Foundation to Year 6) and RealWorld Scenario (Year 6).

MOTIVATING STUDENTS

Marilyn Fleer and Anne Suryani – Monash University Kelli Simmons – EdPartnerships

PLANNING AND IMPLEMENTATION AT MONASH UNIVERSITY

Monash Conceptual PlayLab team delivered via Zoom, a Conceptual PlayWorld professional development program to Laburnum primary school teachers on 17 March 2022 (one hour) and 24 March 2022 (one hour) after school finished.

In the first session, the PlayLab team discussed five characteristics of the Conceptual PlayWorld and provided a series of short videos showing in practice the five characteristics in a range of different settings.

Teachers were very keen to learn about the concepts and were provided with useful resources, such as examples of planning proformas, and they were invited to join Conceptual PlayWorld Facebook group for early childhood educators. In the second session, the teachers had the opportunity to work together in small groups, select a story and complete their planning proformas. Each group then shared their planning, and then discussed and received constructive feedback from the Conceptual PlayLab team. See Figure 1.

Resources were made available through www.monash.edu/conceptual-playworld.

PLANNING AND IMPLEMENTATION AT LABURNUM PRIMARY SCHOOL

The staff had been focussing on developing a teaching and learning approach that enables learner agency and fosters inclusion inspired by Sullivan et al (2021).

Teaching teams noticed that the Conceptual PlayWorld characteristics merged well with the approach. This alignment helped the seamless integration of the characteristics into current planning.

Kelli found that, 'A curriculum development project, in partnership with Monash University, provided a new way to experience mathematical learning'. In 2022 all Laburnum Primary School students and classroom teachers embraced an imaginary situation, a mathematical concept and forged head first into relevant mathematical problem solving.

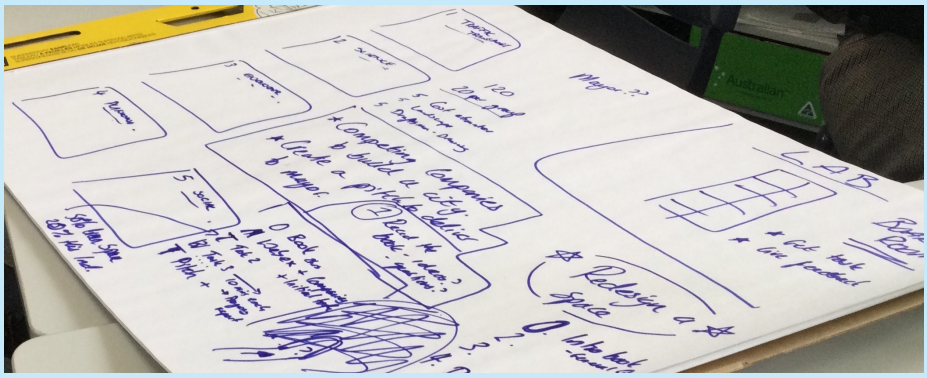


Figure 2. Year 6 PL session planning document.

Figure 3. Embodied learning. A student enacting the pathway of 'through the red cylinder' stated in the clues.

The senior level teams were of particular interest in the early stages of the project. It was the first time senior primary students' responses to the curriculum development, inspired by Conceptual PlayWorld characteristics, were being closely studied. Whilst this can be daunting for some teachers, the senior teams engaged in the project with zest and curiosity.

Kathy said, 'It was different from a project where the focus is on solving a mathematical problem for the teacher, the Conceptual PlayWorld offered a personally meaningful problem that the student learners wanted to solve for themselves'. The experiences offered emotional, social, and cognitive engagement.

Students reported to have enjoyed the challenge, felt they contributed to others' problems, had to explain their reasons mathematically, and were interested in solving the problem in the situation.

EXAMPLES

Here are examples of the engagement of students during the imaginary play mathematical problem solving in 2022.

Junior year level example:

Jump into the story of: *Secret Birthday Message* by Eric Carle.

Authentic problem to motivate learners: A Missing Puppy.

Being a character from the story solving the maths problem: Shape Detectives - Reading and interpreting clues that match regular and irregular shapes to find a lost puppy. (See Figure 3 and the front cover image). Questions from students that were revealed through the investigation:

- What does this shape have that helps us name it?
- What clues link to shapes and objects in my playground?

Senior year level example:

Jump into the story of: *Imagine a City* by Elise Hurst.

Authentic problem to motivate learners: Construction companies bidding for the project to design a city.

Being a character related to a real-life world solving the maths problem: Imagining a city using the concept of estimation and mathematical proficiency of reasoning. As company representatives and construction companies (see Figures 4 and 5).

- How can we build a city for 5 million people within an area of 100km x 100km?
- What is our estimate of schools, hospitals, emergency services, trees, parks, homes, power, roads, etc?
- What might be the estimated cost?

CONCLUSION

The learning experience has since been shared at a Department of Education Principal forum for the Primary Maths and Science Specialist initiative in May 2022 and the 2022 MAV conference. Laburnum looks forward to sharing further insights from the curriculum project as they continue to explore imaginary and real-world play in all year levels at Laburnum Primary School.

AUTHORS

Marilyn Fleer, Laureate Professor, Monash University. Kelli Simmons, Learning Specialist, Laburnum Primary School, and Learning Leader, EdPartnerships and Anne Suryani, PhD Senior Research Fellow, Monash University.

Figure 4. Students enter the board room and representatives of companies interact with the Director (teacher in role) to gather clarity of the mathematical expectations for their companies pitch to design a city.

Figure 5. Students in individual companies collaborating on designing a city with the urban designer (teacher in role).

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Marilyn Fleer unpacked these ideas at the 2022 MAV conference. The annual conference is a terrific event for mathematics educators to learn, network, explore ideas and reconnect.

The Call for Options for the 2023 MAV conference is open and will close on 30/6/23. Each year, mathematics educators including teachers, academics, policy makers, curriculum experts and resource developers come together to share their collective expertise, experiences and ideas. Submissions will only be accepted online, www.mav.vic.edu.au/Conference/Annual-Conference.

THE POWER OF ENGAGEMENT

Andrew Lorimer Derham – Think Square

When am I ever going to use this? More often than not, the student asking this question is actually letting you know they're bored!

This same student will spend hours playing the latest video game and never ask the same question.

Why? Because they like what they are doing. They are engaged and invested. It matters to them. This article will discuss key elements required to harness the power of engagement and provide practical activities for you to try in your own classroom.

ENGAGEMENT IS MORE POWERFUL THAN YOU CAN IMAGINE

Grown adults will dress up in matching colours, put their arms around a complete stranger and sing their team song when watching their favourite sport. Others will pour hours into managing a pretend sports team, obsessing over every decision and conducting 'research' during work hours!

Teens will invest months levelling up a character just so the pixels in their outfit turn a different colour, or move in a different way. Kids will scream, 'I'm not a skink, I'm a butterfly!' at you, because their mind is invested in a different imaginary game than the one you were playing, (at least my kids do!)

As teachers we have an opportunity to harness the power of engagement to help our learners develop skills that enable them to thrive.

In my own classroom this powerful force has seen a class of Year 8's mowing the lawn with a pair of scissors during their lunch break.

It has resulted in a bunch of Year 12's joining me in their school holidays to spend 18 hours on a train attempting to get to every railway station in Melbourne in 24 hours as part of a networks project.

Nobody ever asked me 'When am I going to use this?' because it is obvious that you aren't. Nobody cared, because they were engaged.

Engagement is not simply enjoyment or entertainment (though both are a good starting point). Watching a movie becomes engagement when you are invested in the characters or story. A maths game or activity becomes engaging when a student is invested in their progress.

THE KEY-INGREDIENTS FOR ENGAGEMENT

There are some key principles that I've come to discover over almost two-decades of working with young people. These overarching principles apply to all of us.

Challenge

Everyone I have ever met enjoys a challenge. Everyone. We naturally seek out challenges for no practical purpose just because it makes us feel alive. We climb ridiculously tall mountains, solve seemingly impossible puzzles and drive insanely fast because we want to see if we can.

This does not mean everyone will enjoy the same challenge, but that everyone enjoys the feeling of mastering something just outside of their comfort zone.

Diving off the edge of a pool might be a challenge for one person, but will bore another who needs to jump off a bridge to feel challenged. The teenager who is doing bombs and bellyflops into the water is searching for an appropriate challenge (and probably showing off). If we continue the analogy, my five year old daughter has just learned to dive. It would be irresponsible to give her the same challenge I'd goad a teenager with. She needs to experience a few more wins before she'll attempt something new.

The same is true in your classroom – but giving each student developmentally appropriate work becomes a lot more complex because there are 25 different needs in the one classroom and because that Year 10 boy who is learning rainbow facts/friends-of-ten will feel completely patronised by a worksheet with basic sums on it (especially if it has rainbow unicorns on it).

Applications for the maths classroom

Which of your students need to experience a few wins? Which students need to be extended?

How can you provide rich low-floor high-ceiling activities to allow every learner to engage and find an appropriate challenge.

Practical example in action

Check out this low-floor high-ceiling example, http://thinksquare.com.au/games/fried-circuits-video-instructions.

Contribution

Everybody wants to contribute and know their efforts made a difference.

I remember teaching PE to a group of Year 1 students, who were heavily invested in finding Harry Snotter (a baddie who had stolen the world's supply of tissues). Each week the class would have to use and learn a different motor skill (dodge, jump, throw) to overcome obstacles and recover the stolen tissues.

During recess a Year 1 student approached me with some foil she'd found on the ground. 'I think this is a key to get into Harry's castle.' she said, handing me the rubbish. I made a mental note and included this in the story later that day. The look of pride on her face was priceless, as the 'key' she had found was used to unlock a secret passage into the castle.

That same joy is evident in teens and adults too when they are given meaningful ways to contribute.

Application for the maths classroom

How can we provide problems that allow our learners to be creative and contribute their own unique insights?

Do your students feel like their contributions matter or make a difference?

Practical example in action

Look at this free daily number talks activity which values every contribution: https://games.thinksquare.com.au/tools/spy/daily. You can watch the activity tutorial at https://thinksquare.com.au/games/whos-the-spy-number-talks.

Community

Everyone wants to feel a part of something. Next time you attend a sporting event, look into the eyes of someone wearing matching colours and you will feel some sort of connection, a knowing that you've shared a similar experience.

Community goes much deeper than this, but having a shared experience you remember fondly and knowing you have shared goals with those around you goes a long way to getting buy-in.

Applications for the maths classroom

How can you set class goals, solve communal problems or run activities where students work together and have a positive experience?

Practical example in action

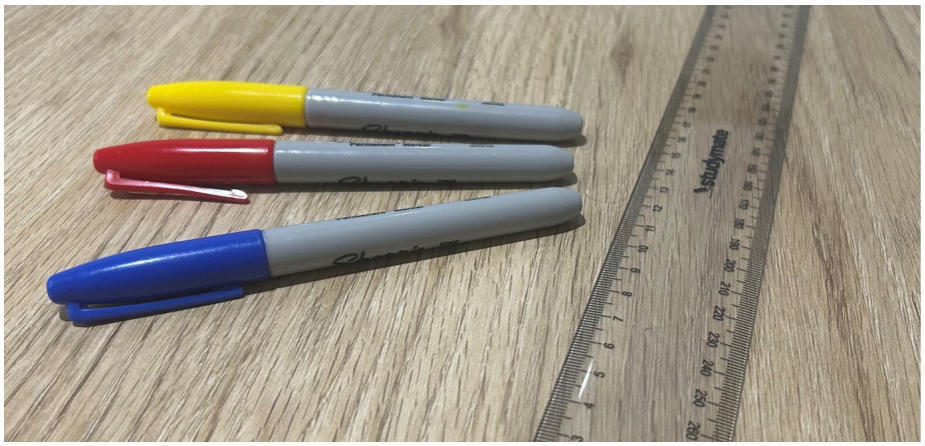
Check out this activity which provides a positive shared experience working with the four operations: https://thinksquare.com.au/games/mathematical-snakes-and-ladders-video-instructions/.

Culture

Culture is best explained in the words of Seth Godin, 'people like us, do things like this'. For the teen brain, culture might be the biggest driving force behind habits and behaviours.

Culture is not fixed, it can be changed and intentionally led. If you've developed a culture of persistence, then this expectation will permeate the majority behaviour. If you've developed a culture of respect, then bullying becomes far less socially acceptable.

Changing culture is a lot like starting a slow-clap. It's intimidating banging your hands together those first few times.



What are the people around me thinking? What if nobody joins in? Those questions can sometimes short-circuit the process.

It is a risk; you are putting yourself out there. It might not work, but you are choosing to lead and give others and opportunity to follow. All it takes is a few people to buy-in (and usually three strong claps) and before you know it the MCG has come alive with noise. It didn't happen by itself. It took courage and intention. If you want to lead the culture at your school, you need both courage and intention.

Applications for the maths classroom

- If you could create a three word motto for your classroom 'students come first', 'learning through effort', 'mistakes, risk-taking, growth' what would it be?
- Identify the key students/people you need to get on board to work toward the culture you desire.
- Identify positive relationships you have already developed.

Practical example in action

Check this activity which has been designed to build a culture of thinking, https://thinksquare.com.au/games/thinking-bingo-video-instructions.

SUMMARY

Engagement requires more than an entertaining video or a funny meme. It's the problems we pose and the way we pose them, how we deliver and set up mathematical experiences for our learners, the relationships we've build and the culture we are leading.

PUT THESE IDEAS INTO PRACTISE!

Three pens and a ruler: 5 minute activity.

Your task is to create an engaging game with just three pens and a ruler (bonus points if it is mathematical).

Your aim is to make a game that players will feel invested in, keeping in mind the four pillars of challenge, contribution, community and culture.

PETER'S REFLECTIONS

Peter Saffin – outgoing CEO, The Mathematical Association of Victoria

A reflection on my six years as MAV CEO... it's hard to know where to start! I'm proud of the impact that MAV has had over the past six years. I've seen growth in the number of events that MAV has held, and growth in attendance from both students and teachers. Feedback from schools indicates they highly value MAV, making for a very rewarding job as CEO! It is great going to work each day knowing that you can have a direct impact on teachers and students. The feedback I received upon my resignation was amazing. I loved this unexpected comment from a regional teacher that was sent to me:

> I wanted to say a big thank you!!! I truly appreciate the way you invest in educators across Victoria, especially those living in rural areas.

I've had a strong focus on partnerships and engagement with the sector. I have worked with many organisations and people to develop ideas, deliver projects and provide advice. All of this has built expertise for MAV as a source of advice, information and services. This has involved bringing staff into the mix to develop their own relationships and knowledge. Together we have grown.

Operationally MAV has flourished. We have focussed on increasing financial sustainability, improving technology and systems, quality services, marketing and communications, membership and most recently, our new online community which looks great! Strengthening and modernising governance has also been a priority area. Under my watch, MAV became a charity, has a new constitution, board charter, governance and risk management policies, and many other improvements.

Juggling a workload across operations, partnerships, strategy, advocacy, governance and staff leadership is what I've loved most. There has been no shortage of challenges! The biggest disruptor being COVID, which I am proud to say MAV staff managed so well. We kept up the pace and were as busy as ever, by evolving and enhancing MAV's services to support educators in their time of need.

A new learning management system was implemented, events went fully digital, including those for students, and we expanded impact to teachers across the state. When many organisations contracted – MAV did not. Our impact was felt by teachers who let us know they appreciated this help and support. Well done to all.

As we emerge from COVID there is also a stronger mindset around equity of access to MAV's services, and staff are more aware that we must balance programs, pricing and access to allow maximum participation for all teachers and students.

A number of education issues have persisted during my time at MAV, including Australia's slide in international performance rankings, the rapid changes in technology and their effects in the classroom (expedited by COVID), NAPLAN, student progression, assessment and data, workforce supply issues and out of field teaching, decline of enrolments in senior maths, the purpose of ATAR and subject prerequisites for university entry, teacher workload, negative perceptions of teachers in the media, curriculum change, pressure on budgets and funding for schools, pedagogical approaches (problem solving vs direct instruction), STEM (rather than MSET – maths first please!) student engagement, evidence based practice, numeracy vs mathematics, equity for students, and quality teaching.

I have been involved in influencing many of these areas, but most are complex problems that will not be fixed or improved in a hurry. My knowledge of the education system and maths education has developed, and it has been a pleasure to discuss, share and write about the many areas of concern. I have come to understand clearly that maths education is not like other subjects. There is so much goodwill, shared knowledge and support available for those working to make a difference. The maths education ecosystem is alive and well! A big thank you to all of those who have welcomed, supported and informed me, to ultimately help me improve MAV's position.

I have been lucky to work alongside the MAV's Board where directors extended support, goodwill and their best intentions. I felt empowered to do my job and make a difference. I encourage everyone to consider becoming a director on the Board at some time – it is a valuable professional learning opportunity.

Thank you to the MAV staff – we worked so well together. I have learnt from each of you. We pitch in, run with ideas and make things happen. That is how you run a small organisation like MAV for maximum impact. MAV staff are truly dedicated to helping educators across our state.

I will watch MAV with interest as it evolves, MAV = opportunity. I feel proud, satisfied, thankful, and now excited about my next opportunity. I hope it can live up to my experience at MAV. I wish you all the best!

Peter is moving to the Victorian Academy of Teaching and Leadership. We wish him all the best and thank him for his dedication to MAV.

GAME DAY

STATS

AGILITY:
ENDURANCE:
CONNECTION:
TEAMWORK:

STATS

FOOTY SMARTS:
ENDURANCE:
ATTENTION TO DETAIL:
ANALYTICS:

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FREE

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To learn more about Game Day or to book the experience for your students in 2023 visit ***www.thehuddle.org.au***

THE HUDDLE

NORTH MELBOURNE

VICTORIA State Government

STIMULATING THINKING

Judy Gregg – Mathematics education consultant

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 Twitter, @maths_vic.

EARLY YEARS

- How many black shapes are on the ball?
- Take turns to kick a soccer ball with two friends. Who kicked the ball the furthest?
- Count the number of flags that you can see on this field.
- Draw one of these flags. What shape is it? How many sides does it have? How many corners?
- What is your favourite number? Draw a picture of a soccer shirt with this number on it.
- If you had 3 soccer balls and you lost one, how many would you have left?
- How many soccer balls do you think would fit into your bathtub?
- Kick a soccer ball back and forth with a partner. Count how many times you can the ball to each other.
- Soccer is played in across different seasons. What do you think the weather is like in the picture? What could the temperature be?

FOUNDATION - YEAR 3

- How many flags do you think are on this field? How could you work it out?
- Look at all the flags. Can you find one that is one third red? Find out what country it is.
- A total of 7 goals was scored in a game of soccer. If Australia scored 2 goals in the first half and New Zealand scored 3 goals, how many goals were scored during the rest of the game?
- Your soccer team scored the following number of goals for each match this past season. Graph the goals for each match. Which match did they score the most goals? Least goals? Which number of goals per match was the most common?
  - Match 1 – 3 goals
  - Match 2 – 5 goals
  - Match 3 – 0 goals
  - Match 4- 1 goal
  - Match 5 – 3 goals
  - Match 6 – 4 goals
  - Match 7 – 3 goals
- If each soccer team has 10 players and one goalie, how many players are there altogether on the soccer field at one time?
- If your school soccer field has a length of 100 metres and a width of 50 metres and you ran around the whole field once as a warm-up before soccer practice how far would you have run?
- What shape is the black part of the ball, and how do you know?
- There are many different shapes on the flags? Can you name five different shapes?
- If you stood about a metre from a soccer net and kicked a soccer ball 10 times, how many times do you think you could get it into the net? What are your chances of getting 10 out of 10 kicks? Give it a try!

YEARS 3 - 6

- What is the length and width of a typical soccer field? Work out the area.
- Draw a soccer field with length, width, and position of the goal nets in proportion.
- Australia scored an average of 4 goals per match over 7 matches. What might their scores have been for each match?
- There are two periods in a soccer match, each of which is 45 minutes long. There is also a 15-minute interval between the two periods. How long does the whole session last for? Convert that into hours and minutes.
- A soccer match begins at 11.45 am and runs for 90 minutes. At what time does the match finish?
- If a soccer ball costs $19 and you bought 6 balls for your team to practice with, what would the total cost be?
- A soccer match is playing at the MCG, draw a map of how to get there from your house, assume that you are driving to the match.
- Pick five countries from the flags that you see and find out how many times they have won the World Cup. Graph their wins. Who won the most? Who won the least?
- If 4 teams play in a soccer lightening carnival how many games must they played to ensure each team plays each other at least once? What if there were 6 teams? 7 teams? Can you find a pattern?

YEAR 7 AND BEYOND

- Design an enclosure for each of the animals. Each enclosure needs to be a different geometric shape and needs a roof. Draw the nets for each enclosure.
- If you were to take this soccer ball apart, what would the net look like?
- Work out the radius, circumference, and the area of a typical sized soccer ball.
- If a soccer stadium can hold 100,000 people and it was 80% full, how many people would be at the match?
- If tickets cost $50 per adult and $20 per child, how much money would the stadium take in total, if 20% of the 80% in attendance were children?
- If FIFA were running a draw to give away 7 free tickets to the final match and 234,000 people, including you, entered the draw, what are your chances of winning a free ticket?
- Choose a soccer formation and use graph paper to place these players on the field. Then use Cartesian coordinates to describe where each player is standing.
- Can you work out the volume of a soccer ball? Are there two ways you could do this? Would both ways work?
- If Australia was on a soccer tour and needed to travel to the following countries to play matches, how far would they have travelled in total If they travelled to Canada first, then went to Mexico, Brazil, Korea, Japan

and then finally travelled home to Australia. Look up the distances between each of these destinations to help you find the total. Figure out the percentage of the distance between each destination compared to the total.

- The FIFA Women's World Cup™ sees 32 nations compete on the international stage in Australia and New Zealand. Create a draw for the 32 teams that ensure a fair system through to the final.
- The FIFA Women's World Cup runs from the 20 July – 20 August. Calculate approximately how many hours, then minutes, then seconds the cup will run for.
- Both Australia and Brazil had 1 win, 1 loss and 1 draw in the pool stages. Brazil scored 8 goals and had 5 scored against them. Australia scored 3 goals and had 1 scored against them. Make a mathematical argument to prove each team should go through and explain why.
- The pattern of a soccer ball tessellates,can you create a design for a soccer ball using both equilateral triangles and squares? Demonstrate how or prove why you can't.
- If a soccer ball was dropped onto concrete from a height of 50m, how far do you think it would bounce back up? Run an experiment (without a crane or tall building!) which would help you make an accurate prediction.

MAV education consultants can come to you and create a professional learning plan to build the capacity of teachers at your school.

If you have an idea for a stimulus image in future editions of Common Denominator, we'd love to hear from you. Email office@mav.vic.edu.au with your suggestions.

ONE MINUTE WITH TORI TUMETH

I'M…

Tori Tumeth and I play football for Melbourne City Football Club in the A-League Women's.

I GOT INTO SOCCER….

At 4 years old. I had an older brother who played and my parents were initially going down to the park to register my energetic brother who was 2. When they told my parents the minimum age was 4, I asked if I could play instead. That's where it started!

MATHS IS PART OF THE GAME ….

Right from the first kick-off. Whether you are trying to figure our where the 2 on 1 overloads are, or calculating how long you have left of the 90 minutes to score an equaliser. Football and maths have more similarities than you may think.

MY PROUDEST MOMENT WAS….

Making my A-League Women's debut for Melbourne City in 2020. We drew 1-1 against Brisbane Roar.

THE FIELD IS BIG ….

It's over 7000 square metres. That's a lot of space for a defender like me to close down! When defending, we want to try cut the field in half to make it easier for us to make tackles and intercept because we'll be closer to our opposition.

WHEN I PLAY, I NEED TO…

Calculate constantly! As a centre back, when in possession, I always want to play to the area of the field where we have more players. It will be easier to keep the ball. Let me ask you a question… is it easier to keep the ball in a 2 vs 2 situation or a 2 vs 1?

GEOMETRY PLAYS A PART TOO…

We are constantly trying to make passing triangles! Triangles are all over the pitch. Whether it be between a centre back, a midfielder and a full back or a striker, winger and a midfielder. Triangles are super hard to defend when there is one defender in between as they will never know which of the two will be passed the ball.

I'M SURROUNDED BY MATHS …

Most people wouldn't notice how much maths plays a role in sport. When we are in the gym, we are calculating how much weight we can lift, when we are working on our speed, we are working with time and distances. There is more maths in soccer than people realise. To play soccer you constantly need to be making decisions that revolve around maths, like the angles of passes and the angles of runs.

MATHS PLAYS A ROLE OFF THE FIELD TOO…

As an athlete we need to look after our body and refuel and recover properly. We need to calculate how much water we drink a day to ensure its sufficient, how much food we are eating to ensure we are getting enough nutrients and how much supplements we are taking to ensure we are training and performing at our peak!

REPRESENTING AUSTRALIA IS…

A goal of mine. I have played for the U17 and U20 Youth National team. I even completed my Year 12 High School Certificate exams in Lebanon while trying to qualify for a youth World Cup!

MY MOST INFLUENTIAL TEACHER...

My Year 10 maths teacher. She showed me how practical maths is and how much we use it in real life situations. She always contextualised equations to a situation that was relatable and applied to us. That's when I truly understood the value of maths.

I'M AMAZED BY….

How much we use maths after school! It surrounds us and everything we do. It's more important than you may think.

WHEN I STUDIED MATHS...

I'd focus on the theory element. It was important for me to learn *why*, rather than just memorising a mathematical rule. I tried to apply the concept to different questions and situations.

I'D ENCOURAGE OTHERS TO...

Be curious! Learn as much as you can and use all the amazing resources you have at school.

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UNDERSTANDING THE BIG IDEAS

Paul West – Bairnsdale West Primary School

UNPACKING THE BIG IDEAS

'That's great that you've got the answer right, but you need to show me how you worked it out'. I'm sure this phrase is one that many teachers are familiar with. As a school, we have changed our lens in maths teaching. What we are looking for in students is now weighted more towards the journey and how they got to their 'destination', rather than correct answers (not to say that getting the answer correct isn't important!). This is reflected in our school's belief in maths teaching, which states that 'students should be encouraged to think and understand in maths, rather than just remember processes and scripts.'

What does this belief look like on the ground? How does it show up in our classrooms, at the pinnacle of a maths session where problem solving is the focus? It means that the selected problems and the numbers chosen need to be conducive to multiple ways for students to access and then work their way through the problem. See Dr Jo Boaler's number talk video from her Youcubed website discussing the sum 18 x 5, www.youcubed.org/resources/stanford-onlines-learn-math-teachers-parents-number-talks/.

So, if that is our focus as a school, how do we need to help our teachers (and support staff) to develop in this area? Most teachers at our school were students in an era where getting the answer right was the only indicator of success and to get to this point we needed to follow a prescribed routine.

For us, this is where our Big Ideas in maths come into the picture. Our Big Ideas are a strategy for helping teachers to interpret the way students have reasoned their way through a problem. This is important when our teaching staff as a collective believe that the best form of assessment comes 'in the moment' – when the student is able to explain or show their reasoning.

As Professor Doug Clarke emphasises:

> Assessments which provide opportunities for students to explain their thinking are more valid, reliable and powerful. Our greatest source of evidence on what students know and can do comes from what teachers see and hear in the classroom.

Figure 1. Students sharing their thinking whilst they make connection within The Big Ideas.

Having opportunities to demonstrate not only what a student may say, but also what they may show is a key point here. As many teachers know, students can demonstrate their knowledge in a huge range of different methods. Accessing the problem in multiple ways means that teachers have a responsibility to plan for students who may encounter barriers, such as language difficulties. This may include the use of manipulatives (I'm a huge fan of taking and printing photos of what kids have made) or delving deeper into the conversation with follow up questions to clarify students' thought processes.

Ultimately, we do not want students who cannot speak, read and write at a high level to be excluded from achieving at a high level in maths.

Sullivan goes on to say, 'one of the major weaknesses of assessments like NAPLAN is that we never know how students worked out their answer, because they are never asked.'

To help teachers to be 'in the moment', our emphasis as maths leaders was on upskilling their understanding of what they were seeing or hearing from students, and our Big Ideas were the avenue for teachers interpreting this information.

If we go back to Dr Jo Boaler's 18 x 5 number talk, there are a number of ways you may see or hear a range of Year 3 or 4 students work their way through this equation and each of these different ways can represent Big Ideas.

- Skip counting by 5's 18 times to get to 90: demonstrating understanding of unitising and repeated addition/patterns (or knowing that each group contains 'five' and this remains the same for each increasing increment).

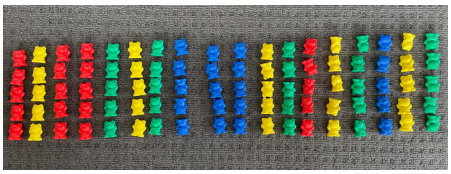

Figure 2: Demonstrates students thinking when using repeated addition or skip counting to solve.

- Breaking 18 up into 10 and 8 to solve the problem through doing (10 x 5) + (8 x 5): demonstrating understanding of distributive properties (or being able to break numbers apart to become practical to work with).

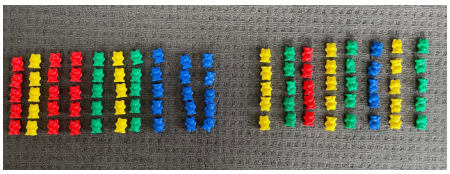

Figure 3. Demonstrates students thinking when breaking 18 x 5 into 10 x 5 + 8 x 5 to solve.

- Working out that 20 x 5 is 100 and then taking away 2 x 5 or (20 x 5) – (2 x 5): demonstrating understanding of multiplying by multiples of 10 (or multiplying using a near practical number and working from here) .

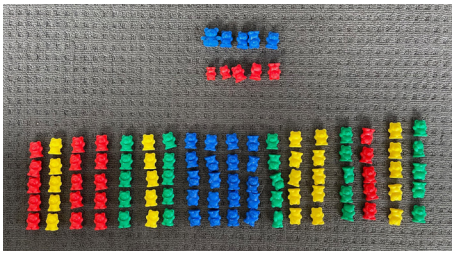

Figure 4. Demonstrates students thinking when rounding 18 x 5 to 20 x 5 and then taking away 2 x 5.

- Halving the 18, so that 9 x 5 is 45 and then multiplying this by 2 or (9 x 5)x 2: demonstrating understanding of associative properties (or being able to manipulate numbers to become practical to work with).

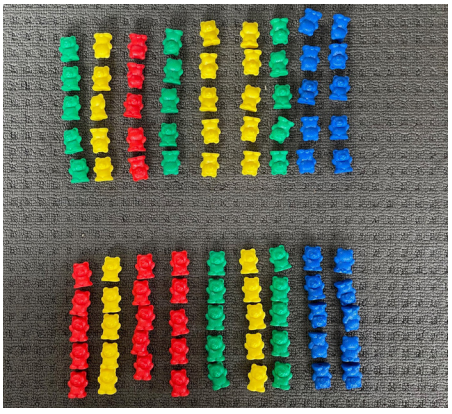

Figure 6. Demonstrates students thinking when doubling 9 x 5 to get to 18 x 5.

- Knowing that 18 x 5 is equivalent to 9 x 10: demonstrating understanding of equivalence (or changing the equation to numbers that are more practical to work with, but equivalent).

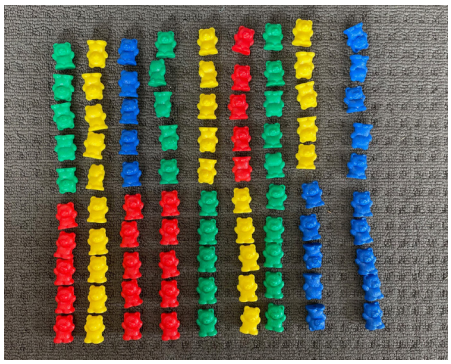

Figure 3. Demonstrates students thinking when making a connection between 18 x 5 and 9 x 10 to solve.

So how does that help with formative assessment? As the old saying goes 'weighing a pig never made it any heavier'. Interpreting student thinking using Big Ideas allows teachers to assess for purpose and easily understand where the student should go next in their learning.

If a student does skip count by 5's to solve this equation, then developing to a more efficient strategy should be their next step. This may involve developing an understanding of patterns that occur when multiplying by ten, so they don't always need to start at zero when they skip count. Or developing their place value understanding, so that they can break numbers apart to make friendlier numbers to work with.

Students that demonstrate more efficient strategies that include Big Ideas, such as manipulating numbers, may need to be challenged to utilise this thinking in a more complex number range. For example, the student that was able to turn the equation into (20 x 5) – (2 x 5) (demonstrating rounding to a friendly number to solve), can they make this connection with money or measurement? Would they be able to round to $8 if the equation was $7.95 x 6 and understand that this is equivalent to ($8.00 x 6) – ($0.05 x 6)? Or round to $10 if the question was $9.50 x 4? Reverting back to whole numbers, would they be able to round down to 400 if the question was something like 406 x 6 and then add on the 6 x 6 later?

Some of these examples may also be suited to the student who constantly breaks numbers apart into place value to solve all of their multiplication. This method can sometimes become more of a 'process' where students begin to just fall back on what they remember, rather than looking at the numbers. For example, it is great that a student can understand that $7.95 x 6 can be shown as ($7.00 x 6) + ($0.90 x 6) + ($0.05 x 6), however it is important in their development that they get past this stage and can see a better connection with solving this problem, such as rounding to $8.

As a driver group in maths, we have been lucky to be involved with MAV's Big Ideas Program. During the first year of the two year program, we have been exposed to experts who have built on our understanding of Big Ideas in maths. Essentially, any school can implement a Big Ideas lens within their maths curriculum, but like any part of the curriculum or any program, it is only as effective as the understanding that individual teachers have. So the aim of our involvement within the program has been to pass on effective professional learning that builds on the understanding of our teachers.

For us as a staff group, the Big Ideas in maths are different ways that help a student access a maths task. At Bairnsdale West Primary School, kids don't need to know the Big Ideas – teachers do – as they effectively support the whole teaching and learning cycle in maths.

TAKE OUT POINTS

- Understanding of Big Ideas helps teachers to access and interpret students' reasoning, in turn providing meaningful formative assessment for future planning.
- The teacher has a responsibility to draw out students' thinking and encourage students to demonstrate their thinking in different ways. Barriers, such as literacy difficulties, should not stop a student from demonstrating their thinking.
- Choice of problem and numbers should encourage different access points and problem solving methods. In the example in this article, number choice is vital to drawing out different strategies.
- Working within MAV's Big Ideas program has evolved our understanding of the Big Ideas.

PLAY YOUR OWN WORLD CUP

Pete Sanders – Mathematics education consultant

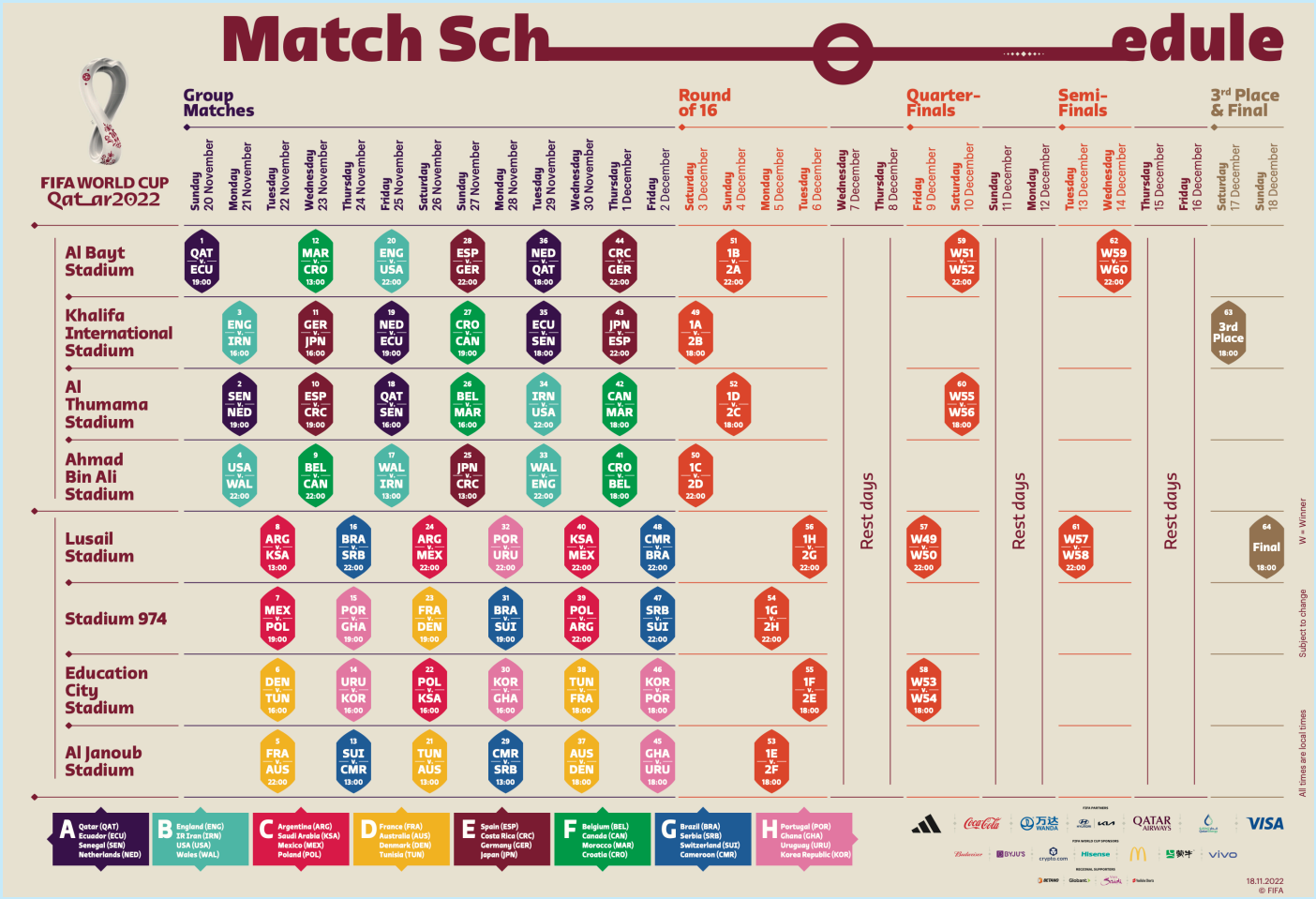

Figure 1. The FIFA 2022 schedule. Source, https://digitalhub.fifa.com.

Two recent events turned my thoughts to my own childhood and my personal development of number sense. Ultimately I wondered how life events and experiences could be utilised in today's primary mathematics classroom.

As a life-long soccer fan (brought up in England so it's hard not to be!) the FIFA World Cup is always a major event. The 2022 World Cup in Qatar was the first tournament to be played in the Australian summer/northern winter and ended with the iconic image of possibly its greatest player, Lionel Messi, holding aloft the trophy.

Whilst the World Cup was going on I, coincidentally, was involved in an MAV writing project in conjunction with the North Melbourne Football Club's educational initiative, The Huddle, on soccer lessons. There is already a sequence of 6 STEM basketball lessons on the Huddle's website, www.thehuddle.org.au/goal, and this latest initiative is to develop 6 STEM soccer lessons for Year 3-6 students. Lesson ideas are currently being trialled in Victorian classrooms.

My primary education in the 60s and 70s was much like most children back then and, sadly too often since I might add, was dominated by a procedural approach.

I happened to be ok at those procedures, I'm not confident that type of schooling developed much number sense. I did, however, develop number sense, largely outside of school, and leaning off my dad's interest in statistics. My dad worked with real things i.e. actual English football tables and cricket averages, but I wanted to play my own games and develop my own data.

There is a popular cricket dice game called *Howzat* which I adapted to create more realistic data, but no such option was available for soccer. I was an avid collector of 1970s football cards and created my own game with these whereby five cards for each team would be tossed into the air. If they landed face-up, a goal was scored by that player, face down meant no goal. Games were played between different English soccer teams and the data collected in many ways: league tables, top scorers, best defences, average goals scored etc.

And so, the World Cup and the Huddle writing project got me thinking about bringing such childhood experiences up-to-date and relating these game making experiences to the current Australian Curriculum and specifically to Statistics and Probability.

SOCCER CHAMPIONSHIP

Soccer Championship aims to replicate the group and then knock-out phase of the World Cup and could be played in primary classrooms as a World Cup theme with children choosing countries of their family background/personal interest or as a simple class-based soccer tournament with children naming their own teams.

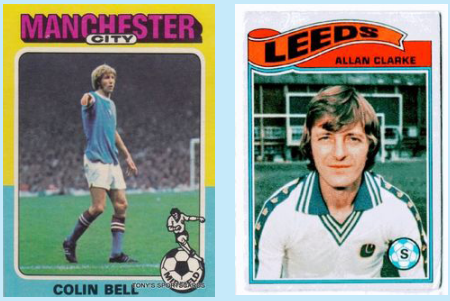

Figure 2. My 1970s football cards.

Games would be played based on a chance based outcome of a heads/tail coin flip or an odds/evens dice roll. Heads/odds could mean a goal is scored, tails/evens would mean no goal. Five of each chance event could be given for each team which would replicate quite well the usual scores of a soccer game.

So, England v Australia could look something like this:

England HTHHT 3 v Australia TTHHT 2

As in most soccer tournaments and leagues, 3 points are awarded for a win, 1 point for a draw and 0 points for a loss. Of course, there would be few 0-0 draws. An alternative approach could be to guess the sequence of outcomes of flipping the coin five times (HTHHT) with each correct guess meaning a 'goal'.

Upper primary children could develop the groups for the group stage of the tournament based on the principle of the same number of teams in each group.

The FIFA World Cup has 8 teams at the Group Stage in groups of 4. The classroom Soccer Championship could replicate this, though groups of 5 or 6 could also be organised depending on the number of children in the class. Teachers could be encouraged to have their own teams if extra numbers are required to make equal groups. Once the group size/structure is developed, a fixture list where each team plays each of the other teams in their group can be organised by the children. A group fixture list from the 2022 FIFA World Cup could be utilised to support this fixture list development, see Figure 1.

This fixture development would develop problem solving skills and the need to explain and justify mathematical thinking would enhance the development of mathematical reasoning. Both problem solving and reasoning are key mathematical proficiencies in the Australian Curriculum.

As the Championship develops, group tables, top scorers (a Golden Boot for the top scorer could be awarded) can be updated. Whilst the knock-out phase of the FIFA World Cup is determined prior to the tournament starting, a live draw in the classroom for each of the knock-out phases (Round of 16; Quarter Final; Semi Final) would provide added excitement.

The FIFA Women's World Cup will be played in Australia and New Zealand in 2023, this could be a great stimulus to this Soccer Championship idea and could boost interest in the mathematics involved in a Soccer Championship as well as in the game of soccer.

GOAL!

Eamon Light – Mathematics teacher, St Anne's School, Sunbury

ENGAGING YOUNG MATHEMATICIANS WITH FOOTBALL AND STEM

'When are we doing GOAL! today?'

These words were music to my ears! What do they mean? Students who are excited to have fun. Students who are excited to learn. Students who are excited to make the most of a rich and valuable learning experience. Students who are motivated to be engaging in mathematics and STEM learning.

Every teacher wants students to be engaged and the GOAL! lessons prepared by The Huddle, in partnership with the Mathematical Association of Victoria and, Melbourne City Football Club, do exactly that. The recently developed GOAL! lessons are football (soccer) themed, STEM-focused learning experiences that use the context of football to engage, excite and extend the thinking and reasoning of children.

A series of six lessons cultivate students' (and teacher) creativity, design techniques, resilience and collaboration. You and your students could be the next engineer through designing a football pitch or engineering a marble run, a statistician through the exploring football and player data. Ever wanted to dabble in fashion? Test your skills as a fashion designer, or you may just like to get outdoors and have fun testing your reaction and speed.

What stands out about the lessons is their practical use in the classroom. They are linked widely throughout the curriculum, but they also include suggestions that align with the Victorian DET's Numeracy Improvement Guide for School Leaders with enabling and extending prompts, mathematical vocabulary, assessment opportunities and opportunities to further enhance learning.

A really exciting factor of the football-focused GOAL! lessons is that players from Melbourne City Football Club are involved. The players talk to the students to set challenges and provide them with meaningful, context-driven scenarios.

There is a natural partnership between sport and engaging learning.

Most students are engaged by sport, many students will love seeing football heroes introducing a task or challenge. These lessons have natural cross curriculum links with health and physical education, they also focus on the capacities critical and creative thinking, ethical, interpersonal, personal and social.

The GOAL! football lessons have been designed to engaged all students regardless of their passion for sport of football. With balanced gender representation from both women's and men's teams, and careful planning around diversity and equity, students will feel connected to the lessons.

I was lucky to pilot these lessons in my classroom at the end of 2022. The Year 3 students were completely immersed in their learning. I was thrilled by the breadth of learning achieved through each lesson. The students' knowledge of football increased as did their ability to collaborate, design, problem solve and communicate.

As a passionate mathematics teacher, I was personally excited about the real-world applications of mathematics through the lessons. Students were learning to develop their understandings and skills of:

- Estimation and measurement of time e and calculating differences in their records.
- Estimation and measurement of length and area.
- Calculate scales and ratios.
- Collecting, analysing, comparing, and presenting data, in both tables and graphs.
- Exploring financial numeracy and using mathematics to ensure effective decision making.
- Describe and investigate rotations, reflections and the use of symmetry in design using 2D shapes.
- Develop and effectively use positional language.

Each lesson has specific links to the Victorian Curriculum content descriptors and standards. The lessons are rich and open, ensuring they can be differentiated to meet all students' needs and would be appropriate to use from Years 3 - 6 and beyond.

These lessons are the second collaboration the MAV has had with The Huddle with the first six basketball themed lessons engaging over 20, 000 students with in the first six months. It's a hit!

GOAL!
INSPIRING BRIGHTER FUTURES

To check out the free basketball themed STEM lessons visit www.thehuddle.org.au/goal. To be a part of the first pilot of our football themed lessons, contact Jen Bowden, jbowden@mav.vic.edu.au.

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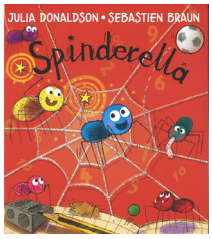

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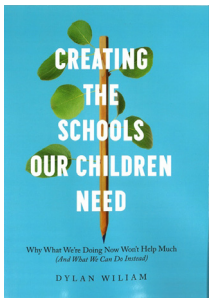

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