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TRIGMASTER 9-12

Remember the *Trigmaster*? MAV have produced a new version of the old classic. The essence of *Trigmaster* is the unit circle. Students from Year 9-12 need to know about trig ratios of angles greater than 90° and start to think of sine, cosine and tangent as periodic circular functions. Once students understand this, right-angled triangle applications are quite simple applications.

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The Common Denominator

The Newsletter of The Mathematical Association of Victoria

Newsletter 241
February 2012

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Literate, numerate and curious



The Mathematical Association of Victoria is keen to recognise and support schools who are effectively engaging their students mathematically. The engagement isn't just limited to students: it's important that the wider school community also is involved in activities and events that demonstrate the value of mathematics to society and that promote active learning and enjoyment of mathematics.

In 2012, MAV have launched the Mathematics Active Schools initiative. Schools can apply to MAV to be recognised as Mathematics Active.

Kingsbury Primary School is the first Mathematics Active School recognised by the MAV. Kingsbury have a vibrant focus on mathematics which has developed over the last four years. Principal Barbara Hinsley explains:

"During a regular mathematics lesson at KPS, students are provided with a differentiated curriculum specifically designed with clear learning intent and success criteria.

All children in the class are active in the 'whole-part-whole' model, in large and small groups or pairs engaged with hands-on activities. At the end of each lesson, teachers reflect with students during 'share-time'. This gives students a chance to explain their learning and report against the success criteria.

We use lots of different maths strategies with our students, like guess and check, they make models, we have fishbowl demonstrations and of course, daily number fluency activities.

Most of this success evolved from an action research project that KPS undertook in 2008, *Thinking Like a Mathematician*. As part of the project all staff were involved in setting school and team goals regarding their professional mathematical practice.

Continued on page 4

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From the president

Allason McNamara - Head of Mathematics, Mount Scopus Memorial College

I was delighted to be asked to present some of the Maths Talent Quest Awards on Thursday 27 October at La Trobe University. Many primary and secondary schools attended from around the state, including many rural schools. There were so many happy faces and proud parents - MTQ is such a worthwhile activity and I would encourage schools who have not yet taken part to give it a go in 2012. Jennifer Bowden will be running three workshops on MTQ during February. This is a great chance to learn more about MTQ and the benefits it provides both to schools and students who take part. To register for a workshop, visit www.mav.vic.edu.au/pd.

Another event which was a huge success was the presentation of the Australian Mathematics Trust Annual Awards by Professor J Hyam Rubinstein from the University of Melbourne, on Friday 11 November 2011, at Brunswick Town Hall. The photos can be viewed at www.amt.canberra.edu.au/melbournephotos.html

I would like to thank the teachers and schools who ran the State-wide Mathematics Games Days this year: Peter Maher (Year 5) and Joanna Carasavidis (Year 8) at Penleigh and Essendon Grammar, Ferruccio Servello (Year 6) at Genazzano FCJ College, Robyn Garnett (Year 7) at Overnewton Anglican Community College, Colin Shnier (Year 7) at Wesley College Elsternwick Campus, Elle Borgese and Marie Giampiccolo (Year 9) at Princes Hill Secondary College, the maths faculty at Mount Scopus Memorial College (Year 10) and Robyn Crockett (Years 11 and 12) at Camberwell Grammar School.

In particular I would like to thank Elle Borgese and Marie Giampiccolo from Princes Hill Secondary College for the work they have done with the Year 9 Mathematics Games Days and welcome to Steven Capp from McClelland College who will run the Year 9 Games Day this year.

Another round of ACARA consultations has taken place. Jennifer McKinnon represented the MAV for Essential and General Mathematics and Philip Swedosh did the teleconference for Mathematical Methods and Specialist Mathematics. The next round of consultations will take place early this year.

The 2011 *Maths is Multi Dimensional* Annual Conference which was opened by the Hon Martin Dixon, the Minister for Education, was a huge success. Congratulations to Jeanne Carroll and the Conference committee and to Julie Allen and the Full Pretzel team for the smooth organisation. 2011 was Jeanne's last year as Conference Convenor. Michelle Huggins will be taking over the role in 2012. See page 14 for more about the conference.

I would like to thank Jill Brown who has recently resigned from Council, for the work she has done for the MAV. She was the Vice President and Convenor of the Journals Committee, a very talented, kind and thorough person. Her contribution to the Council and the Journals committee

will be missed. Dr Ahmad Samarji will be taking over the Convenor's role. He is a Lecturer (Maths and Science Curriculum-ICT Innovation) at the School of Education at Victoria University.

Dr Jeanne Carroll, Simon Pryor (MAV CEO) and I travelled to AAMT's Annual General meeting in Newcastle in January. We discussed AAMT's constitution and took the opportunity to look at how the Associated Affiliations can help teachers from around Australia to implement the National Curriculum.

The 2011 MAV staff: Ian Lowe, Sharyn Livy, Jennifer Bowden, Ellen Corovic, Mike Westbrook, Louise Gray, Julie Allen, Melanie Savic, Michael Green, Zofia Wiacek, Darinka Rob and Simon Pryor have done a wonderful job this year. They are a very dedicated team who work tirelessly for the members of the MAV.

I wish you all the best for the new year.



A proud pupil from Strathaird Primary School with her certificate at the MTQ ceremony.

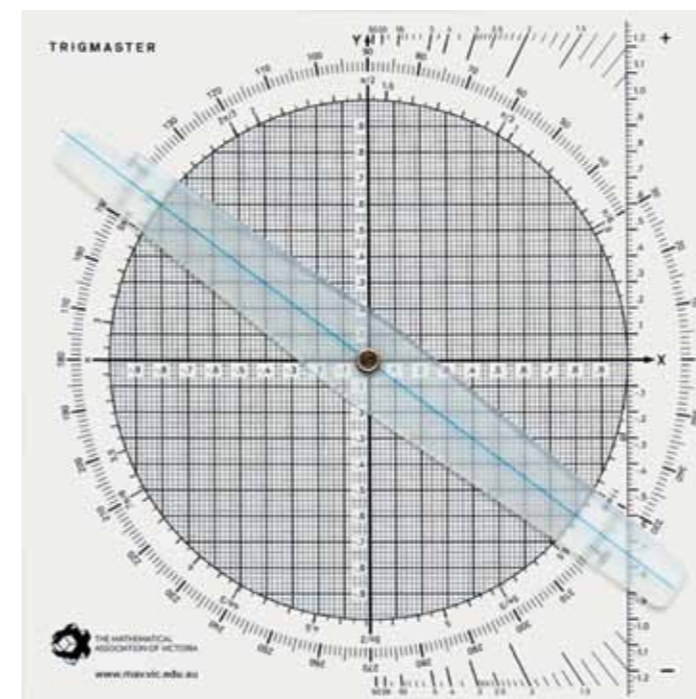
Maths Talent Quest workshops

Tuesday 21 February, 3.30-4.30pm, Hadfield
Tuesday 28 February, 4-5pm, Brunswick
Friday 16 March, 3.30-4.30pm, Yarragon

To register, visit www.mav.vic.edu.au/pd

Return of the Trigmaster

Ian Lowe, MAV Professional Officer



What do teachers say about Trigmaster?

I think it is one of the best tools in teaching the concept of the trig ratios and allowing the students to really understand how the ratios can be used.

Looking forward to getting new ones! Our old ones are held together with sticky tape!

Our faculty currently has one old set which is slowly decreasing in numbers, we are keen to get another class set and also replace our current set.

We have a small (very small!) class set of Trigmasters which I use when I introduce the unit circle. I have photocopied it so that all students can have access to it. Being able to purchase some new ones will be great. I found that Trigmaster was a really great thing to use for teaching theoretical trig. The kids really 'got it' from using them in the early stages of trig.

I have a class set of Trigmasters that are probably 30-40 years old and are mostly falling apart!

Our current Trigmasters are a little worse for wear as they are used heavily.

They're fantastic. I'd love a class set or two.

I would love to buy new Trigmasters. I often wish I hadn't disposed of my own from some long forgotten school days!

Many Year 9 and 10 teachers and students have pleasant memories of Trigmaster, the tool that helped them make sense of trigonometry. With permission from its inventor, Graham Willis, the MAV is now remanufacturing the Trigmaster, and it is better than ever!

The essence of Trigmaster is the unit circle. Any student who uses trigonometry past right-angled triangles in Year 9 (including Year 10 for the Australian Curriculum) will need to know about trig ratios of angles greater than 90° . Once this happens it is easy to go to the full 360° and start to think of sine, cosine and tangent as periodic circular functions. Once this is understood, the right-angled triangle applications are quite simple applications.

Graham invented Trigmaster in 1961 during his second year of teaching at Box Hill High School. He also invented a 'Prob Stat' kit, and a display grid called the Maths Master. He taught at Eltham and Reservoir before working at the Secondary Teachers College, located in the University of Melbourne. He became an Inspector of schools, and had responsibility for mathematics in secondary schools and was on the panel of VUSEB, (the fore-runner to VCAA.)

Graham became president of the MAV in 1974, where he installed the first EO, Robert Money. To support mathematics teachers and coordinators he started the Secondary Maths Committee, one of its major productions being GLIMA (Guidelines in Maths Activities), written by Ian Lowe. Graham became president of AAMT in 1978. Graham Willis is a life member of MAV.

A few years after becoming chairman of the panel of inspectors, he was appointed the Assistant Region Director for Tullamarine, and eventually Assistant General Manager for Western Metropolitan Region. At the time of his retirement from the Education Department, he was Acting General Manager for that region.

Trigmasters can be bought individually for \$12.50 (member price) or as a class set of 10 for \$100 (member price)

To order, visit www.mav.vic.edu.au/shop or telephone 9380 2399.

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Literate, numerate and curious (cont. from pg 1)



The project was initiated from a combination of our NAPLAN/AIM results and also teacher's anecdotal notes from the classroom. That same year, KPS was supported by a Regional Coach to facilitate better teaching practice in Years 4, 5 and 6. Teachers formed teams and had a shared direction. I was confident that by focusing on effective teacher practice, we'd see improved student learning outcomes – which we did. As a Phase 1 AiZ (Achievement Improvement Zones) school, KPS decided to continue to have a strong focus on concept development, skills and knowledge and application of Mathematics.

The project was terrific. We saw teachers become accustomed to discussing best practice in mathematics and what it should look like in the classroom. This dialogue allowed for common understanding and also came in handy for 'learning walks' – where teachers visit each other's classrooms and see what happens and how another teacher teaches. Feedback from the learning walks has been great, it is provided to teachers in a non-threatening way and I've seen lots of new ideas that have sparked from this type of peer observation.

At our staff meetings, teachers share different strategies and discuss over arching mathematical ideas. The E⁵ Framework is used as a guide for teachers and school leaders to determine what constitutes high quality instructional practice.

4 KPS teachers use the Early Years Numeracy Interview

and also use On-Demand testing to plan more effective differentiated learning programs for their students. PLT meetings are held fortnightly to review student progress against the mathematics continuum and to plan tasks specific to the learning needs of those students.

Our focus on mathematics professional development has seen our teachers work with Professor Peter Sullivan, Dr Sue Gunningham, Michael Ymer and Charles Lovitt. After these professional development sessions, our teachers shared knowledge with others (train-the-trainer model) and more frequently used hands-on materials, rich tasks, open-ended questions and Maths300 became a regular feature of the mathematics classroom at KPS.

Since then, the school has worked on developing consistency of practice using the work of David Hopkins (Powerful Learning 2009) with the central idea being the creation of learning environments where students would all achieve maximum results – specifically, to be Literate, Numerate and Curious.

KPS developed a numeracy plan that focuses on:

- monitoring and assessment
- teaching and learning and
- professional development.

KPS has established collaborative learning spaces on the Ultranet, purchased Mathletics for home-school learning, held evening educational maths forums, open days, theme days (Potato Olympics) and published photo stories in

the school's newsletter – all of this demonstrates our commitment to mathematics and shows how highly it is regarded by the school.

In 2012, we plan to document our teachers' agreed philosophy of mathematics teaching, to embed consistent exemplary teaching approaches and to refine existing documents akin to the Northern Metropolitan Region

Improvements Strategies for Powerful Learning.

MAV's Mathematics Active Schools initiative is welcome recognition of all the hard work that our school and teachers have put in over the last few years. We are very proud of our mathematics focus and the improvements in our students learning are testament to the fact that our strategy is working."

Mathematics Active Schools: An initiative of the MAV

What is it?

MAV's Mathematics Active Schools initiative is a way to recognise and support schools who are effectively engaging their students mathematically.

Who can apply?

Any Victorian registered school (primary, secondary or P-12).

What's the criteria?

The eight criteria are listed opposite. The MAV don't expect schools to necessarily excel in each of the criteria listed, but expects that schools have plans in place to move toward achieving the criteria.

Before you apply, you'll need:

- the support of your principal
- to provide short statements of evidence against eight criteria (see right)
- a purchase order number
- to be an MAV member school

What happens after the application is submitted?

Once you have completed the online application form, a panel of MAV professional officers and councillors will consider your school's application. If your application is approved, you'll be notified and a package of Mathematics Active support materials and a plaque that designates your school as Mathematics Active will be sent to you.

What's in it for you and your school?

- public recognition of your schools mathematics program
- increased support and awareness of mathematical professional development, activities and resources
- a package of MAV materials and services that promote active learning of mathematics
- demonstration to students and parents that mathematics is enjoyable and valued by your school and its teachers
- a robust recruitment tool that enables prospective students and parents to see that your school is active in its teaching of mathematics
- the right to display a certificate and use a Mathematics Active Schools logo on school newsletters, letterheads and communication materials
- mathematical content supplied by MAV for use in your

Mathematics Active Schools criteria:

1. actively supports the mathematics professional learning needs of staff
2. structures school mathematics program to maximise learning
3. promotes active learning of mathematics
4. participates in student mathematics activities
5. promotes differentiated learning
6. uses assessment to inform teacher practice and promote learning
7. sees parents as valuable partners and actively encourages and support parental involvement
8. promotes the effective use of technology in the learning of mathematics.

- school newsletter or other suitable reproduction
- free attendance at MAV's Teach Mathematics for Understanding professional development workshop. This PD will be held in several locations around the state and schools can book into whichever location suits them best.
- inclusion in the program may assist with the recruitment and retention of talented mathematics staff
- priority for inclusion in pilot programs and initiatives that the MAV undertakes in conjunction with higher education institutions and government
- the program is recognition of your school's existing mathematics practice - it doesn't require additional work from teachers.

The Mathematics Active Schools program carries a special introductory fee for 2012 of \$350 for small schools and \$450 for large schools.

The deadline for applications is Friday 30 March 2012. To apply, visit www.mav.vic.edu.au/mathematicsactive. For more information, telephone MAV on 03 9380 2399.

Book review: Charlie Weatherburn and the Flying Machine

Angela Kotsiras - Head of Mathematics, Ivanhoe Girls' Grammar School and Network co-ordinator of Heads of Maths in Victoria



How many children nowadays know of any famous Australian mathematicians? As someone who loves to promote the power and beauty of mathematics and have read many books about mathematicians, I was delighted to read a children's book about a mathematician.

Matthew Magain, the author and illustrator of *Charlie Weatherburn and the Flying Machine*, introduces young readers to the power of mathematics using humour, rhyming verse and many bright and colourful illustrations that provide plenty of context. I love this book, it is entertaining for both adults and for children aged between 2 and 6.

It's a book about bumbling mathematician, Charlie Weatherburn, who uses mathematics to create a solo flight. I like the part where he falls into the garbage bin and the illustration is shown from a bird's eye view. This can be a good starter to introduce children to perspective drawing or even to map drawing.

On every page Charlie is accompanied by his bird friend and even the irrational number pi is introduced symbolically on his umbrella and his flying outfit.

Charles Weatherburn was an Australian mathematician in the 1900s. He made major contributions to the field of vector analysis and differential calculus. As the author points out in his Tech.Ed talk on the "Pursuit of Perfection" (<http://magain.com/blog/article/118/the-pursuit-of-perfection>), while it is not known if this mathematician has tried solo flying, he will be known to children who read this book. I would highly recommend this book for use in primary schools.

Charlie Weatherburn and the Flying Machine is \$15 (member price) is available at www.mav.vic.edu.au/shop

Teaching in the Australian Curriculum

Chris Powers, Numeracy co-ordinator, Timbarra P-9 College

In my role as Numeracy Co-ordinator, it is my responsibility to learn as much as I can about the Australian Curriculum and how it will impact on mathematics teaching, learning and assessment, when it is implemented fully in 2013. With this aim in mind I attended the first TEAM:P (Teaching English and Mathematics:Primary) conference in October 2011.

I attended the keynote by David Howes that focussed on our transition to the Australian Curriculum. David is the General Manager of the curriculum division of Victorian Curriculum and Assessment Authority (VCAA). This session gave me valuable information in relation to how the current VELs progression points will merge with the proficiencies in the Australian Curriculum.

I am currently teaching Year 7 mathematics after 20 years of being a primary classroom teacher having spent most of that time teaching Year 5 and 6. I am always on the lookout for ways to make mathematics interesting and hands on whilst being relevant to Year 7 students. Jennifer Bowden's session on Working Mathematically in the Australian Curriculum gave me lots of great ideas such as the 4 Cube House activity from Maths300.

The activity involved using four cubes to make as many different housing designs as possible, I began to think of the applications it would have for Year 7 algebra. I was in the middle of trialling a unit for the MAV on differentiated

curriculum in algebra and trying to find interesting, relevant and engaging activities for year 7 students can be a challenge!

The following week I had refined the lesson from Maths300 by challenging different groups of students to find how many different designs can be made from 3, 4, 5 and 6 cubes. This allowed me to group the students according to their investigative ability to solve a group problem. We then drew the houses on grid paper and formulated an algebraic table to see if we could find a rule that would work for any number of cubes. The students were engaged for the whole class and wanted to continue into the next lesson.

Like all teachers, I like to come away from each professional development experience with new knowledge and activities that I can implement with my students straight away.

I felt the TEAM:P Conference gave me both.

The second TEAM:P conference is coming up in March (see below). There will be a great line up of speakers including Colleen Vale and Peter Sullivan. Register early to secure your place.

Visit www.mav.vic.edu.au to register.

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- UPCOMING CONFERENCE

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Your MAV membership gives you a discounted conference rate.

THE MATHEMATICAL
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VATE
Victorian Association for
the Teaching of English

TEAM:P is for primary school teachers. It is a partnership between MAV and VATE and aims to assist primary school teachers with interpreting the Australian Curriculum and developing and resourcing teaching programs.

Dicetastic!

Quick attack

Level: F – 6 (depending on variation)

Skill: automatic recall of number facts

Equipment: two large six sided dice

1. The whole class sits in a circle
2. Choose two students to start
3. Roll the dice and ask the two students to call out the sum of the dots on the dice
4. The winner stays on and plays the next person sitting in line in the circle
5. The aim is for a student/s to become Maths Champ by winning five games in a row and then they retire.
6. Continue around the circle until everyone has had a turn
7. When you get to the last person let them play on until they either become Maths Champ or lose

Variations:

- Use a dotted dice and numeral dice and practice counting on
- Multiply the two dice together
- Roll three dice and add them all together
- Roll three dice, add the lowest two and multiply by the highest dice.

Dice tower

Level: 1 – 4

Skill: addition, subtraction and creating rules

Equipment: three six sided dice

1. Place the three dice on top of one another
2. Ask the class: "Can you tell me the sum of all the hidden numbers?"

'Hidden numbers' means the faces of the dice that cannot be seen without knocking over the tower. There are five hidden numbers.

Can you work out a formula or rule that will work each time the tower is made?

Higher and lower

Level: 1 – 3

Skill: ordering number, chance

Equipment: three ten sided dice

1. Ask students to sit in partners
2. Student A rolls two of the dice
3. Student B has to guess when they roll the next dice whether the number will be higher, lower than the smaller or in between the two dice that have already been rolled
4. Students then swap over turns
5. Students can keep a record of who wins.

MAVshop has lots of books with more great dice games.

Visit www.mav.vic.edu.au/shop



Negative numbers

Level: 4 – 7

Skill: recognising negative numbers

Equipment: two six sided dice and a roll of masking tape

1. Create a ladder using masking tape on the floor, it needs to have 11 rungs
2. Draw a 0 on the middle rung and number the rungs 1 to 5 on one end (include the number 6 past the last rung).
3. Repeat with -1 to -6 on the other end
4. Ask Student A to stand on the 0
5. Ask student B to roll a dice. Student A takes the number on the dice and steps towards larger positive numbers
6. Students C rolls the dice and Student A then takes that many steps in the opposite direction
7. The aim of the game is to either save Student A by getting them safely off the positive end or by Student A falling off the ladder at the negative end
8. For a more detailed version of this game, visit Maths300 and search "Walk the Plank".

MAV Professional development 2012

TERM 1 AND 2

PRIMARY

WHAT	WHO	WHEN	WHERE
Assessment in the early years (Workshop series: 1 of 2)	F - 2	Tuesday 20 March, 3pm - 5pm	Brunswick
TEAM:P conference	F - 6	Friday 23 March, 9am - 3.30pm	Moorabbin
Assessment in the early years (Workshop series: 2 of 2)	F - 2	Tuesday 27 March, 3pm - 5pm	Brunswick
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 1 of 2)	F - 6	Tuesday 24 April, 4pm - 6pm	Southern metro region
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 2 of 2)	F - 6	Tuesday 1 May, 4pm - 6pm	Southern metro region
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 1 of 2)	F - 6	Tuesday 15 May, 3pm - 5pm	Brunswick
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 2 of 2)	F - 6	Tuesday 22 May, 3pm - 5pm	Brunswick

PRIMARY AND MIDDLE YEARS

WHAT	WHO	WHEN	WHERE
Maths Talent Quest: promoting MTQ in your school	F - 10	Tuesday 21 February, 3.30pm - 4.30pm	Hadfield
Maths Talent Quest: promoting MTQ in your school	F - 10	Tuesday 28 February, 4pm - 5pm	Brunswick
Maths300 and differentiation in the Australian Curriculum	3 - 10	Friday 9 March, 9am - 3.30pm	Geelong
Maths300 and differentiation in the Australian Curriculum	3 - 10	Friday 16 March, 9am - 3.30pm	Wangaratta
Maths Talent Quest: promoting MTQ in your school	F - 10	Friday 16 March, 3.30pm - 4.30pm	Yarragon
Understanding algebra in the middle years (Workshop series: 1 of 4)	5 - 10	Monday 23 April, 3pm - 5pm	Brunswick
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 1 of 2)	5 - 10	Tuesday 24 April, 3pm - 5pm	Brunswick
Teach maths for understanding (Workshop series: 1 of 2)	F - 10	Monday 30 April, 3pm - 5pm	Brunswick
Maths300 and differentiation in the Australian Curriculum	3 - 10	Friday 4 May, 9am - 3.30pm	Traralgon
Understanding algebra in the middle years (Workshop series: 2 of 4)	5 - 10	Monday 7 May, 3pm - 5pm	Brunswick
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 2 of 2)	5 - 10	Tuesday 8 May, 3pm - 5pm	Brunswick
Maths300 and differentiation in the Australian Curriculum	3 - 10	Friday 11 May, 9am - 3.30pm	Ballarat
Teach maths for understanding (Workshop series: 2 of 2)	F - 10	Monday 14 May, 3pm - 5pm	Brunswick
Maths300 and differentiation in the Australian Curriculum	3 - 10	Friday 18 May, 9am - 3.30pm	Horsham
Understanding algebra in the middle years (Workshop series: 3 of 4)	5 - 10	Monday 21 May, 3pm - 5pm	Brunswick
Teach maths for understanding (Workshop series: 1 of 2)	F - 10	Monday 28 May, 4pm - 6pm	Eastern metro region
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 1 of 2)	5 - 10	Tuesday 29 May, 4pm - 6pm	Western metro region
Understanding algebra in the middle years (Workshop series: 4 of 4)	5 - 10	Monday 4 June, 3pm - 5pm	Brunswick
Teach maths for understanding (Workshop series: 2 of 2)	F - 10	Tuesday 5 June, 4pm - 6pm	Eastern metro region
Working mathematically in the Australian Curriculum: Number and algebra (Workshop series: 2 of 2)	5 - 10	Tuesday 19 June, 4pm - 6pm	Western metro region

MIDDLE YEARS AND VCE

WHAT	WHO	WHEN	WHERE
SAC (School assessed coursework) evening	VCE	Monday 20 February, 5pm - 7.30pm	Ballarat
SAC (School assessed coursework) evening	VCE	Thursday 23 February, 5pm - 7.30pm	Moe (Maths Methods CAS)
SAC (School assessed coursework) evening	VCE	Thursday 23 February, 5pm - 7.30pm	Shepparton
SAC (School assessed coursework) evening	VCE	Monday 27 February, 5pm - 7.30pm	Moe (Further Maths)
SAC (School assessed coursework) evening	VCE	Monday 27 February, 5pm - 7.30pm	Northcote
SAC (School assessed coursework) evening	VCE	Tuesday 28 February, 5pm - 7.30pm	Moe (Specialist Maths)
SAC (School assessed coursework) evening	VCE	Wednesday 29 February, 5pm - 7.30pm	Burwood
Meet the Examiners	VCE	Tuesday 20 March, 5pm - 7pm	Horsham
Meet the Examiners	VCE	Monday 26 March, 5pm - 7pm	Williamstown
Meet the Examiners	VCE	Wednesday 28 March, 5pm - 7pm	Geelong
Meet the Examiners	VCE	Monday 16 April, 5pm - 7pm	Moe (Further Maths)
Meet the Examiners	VCE	Tuesday 17 April, 5pm - 7pm	Burwood (Maths Methods CAS)
Meet the Examiners	VCE	Wednesday 18 April, 5pm - 7pm	Burwood (Further Maths and Specialist Maths)
Meet the Examiners	VCE	Thursday 19 April, 5pm - 7pm	Moe (Maths Methods CAS)
CAS Further Mathematics (Workshop series: 1 of 2)	VCE	Thursday 3 May, 5pm - 7pm	Burwood
CAS Further Mathematics (Workshop series: 2 of 2)	VCE	Thursday 10 May, 5pm - 7pm	Burwood
CAS Further Mathematics (Workshop series: 1 of 2)	VCE	Thursday 17 May, 5pm - 7pm	Brunswick
CAS Further Mathematics (Workshop series: 2 of 2)	VCE	Thursday 24 May, 5pm - 7pm	Brunswick
CAS calculators in Year 9 and 10 (Workshop series: 1 of 2)	9 - 10	Tuesday 29 May, 5pm - 7pm	Clayton
CAS calculators in Year 9 and 10 (Workshop series: 2 of 2)	9 - 10	Tuesday 5 June, 5pm - 7pm	Clayton
CAS calculators in Year 9 and 10 (Workshop series: 1 of 2)	9 - 10	Tuesday 12 June, 5pm - 7pm	Brunswick
CAS calculators in Year 9 and 10 (Workshop series: 2 of 2)	9 - 10	Tuesday 19 June, 5pm - 7pm	Brunswick

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WWW.MAV.VIC.EDU.AU/PD

MAV MEMBERS GET A 20% DISCOUNT ON ALL PROFESSIONAL DEVELOPMENT WORKSHOPS

In addition to the events listed above, MAV professional officers can tailor professional development workshops to teachers and schools.

Telephone 03 9380 2399 or email jbowden@mav.vic.edu.au to find out more.

*Some sessions and venues may be subject to change. MAV's website will display the most up-to-date information.

2012 MAV membership

If you haven't already done so, it's time to renew your MAV membership. MAV membership runs to a calendar year, so make sure you renew now to get all your 2012 benefits.

The MAV have a new online membership system so you can review the information the MAV holds on you and your school. You can add and remove teachers from your school record and edit details.

To access the online membership system, telephone MAV on 03 9380 2399 for your username and password.

MAV ran a competition for early bird renewals. Congratulations to all the winners and thanks to all the schools and individuals who have renewed their 2012 membership or joined MAV for the first time.

First prize

Liddiard Primary School: a free two-hour PD session at your school plus a \$300 gift voucher to spend at MAV's online shop.

Second prize

Montmorency Secondary College: \$200 MAVshop gift voucher

Third prize

Livingstone Primary School: \$100 MAVshop gift voucher

MAV membership entitles you to

- 20% discount on all professional development workshops
- 20% discount on all titles and resources in MAV's online shop
- 4 issues of our newsletter, *Common Denominator*, each year
- 4 issues of our primary journal, *Prime Number* and/or our secondary journal, *Vinculum*
- networking opportunities at our conferences and events
- automatic membership of the national body, AAMT (Australian Association of Mathematics Teachers)
- involvement in a highly respected, proactive professional association that fosters the promotion of mathematics and mathematics education

You can join MAV as an institutional member and also as an individual member. Lots of teachers choose to join as both so they receive their own personal copy of our journals.

Membership prices and details are available at www.mav.vic.edu.au/about-us/membership

Don't touch my asymptote

Over the years, the MAV has sold thousands of maths badges to hundreds of schools, teachers and students. At the 2011 MAV conference, teachers were begging us to bring back the *Don't touch my asymptote* badge. Good news - we plan to have this design available in 2012!

We are also considering resurrecting *I'm a mathesaurus*, if you'd like to see this badge come back, post 'Mathesaurus' on our Facebook page (www.facebook.com/mathematicalassociationofvictoria). If 50 people post about Mathesaurus, we'll pull him out of the archives and turn him into a badge.



Design a badge

The MAV plan to produce new badge designs in 2012 and we are throwing the challenge out to you. Come up with a badge design or encourage your students to have a go. Designs need to be mathematically orientated, and the artwork should be designed to fit a 44mm circle.

Entries are open to any MAV member, student or teacher from an MAV member school. Email your design (in high resolution PDF format) to drob@mav.vic.edu.au by Friday 30 March.

MAV badges in stock



Badges are great prizes for students and terrific for Maths Week and other events on your maths calendar.

You can order quantities of specific designs or get a mix of different designs.

\$1 each (member price) or \$75 for 100 badges
Order from www.mav.vic.edu.au/shop or telephone 9380 299.

FREE POSTCARDS

Attention Math Methods teachers

In this edition of *Common Denominator* you'll find RMIT's free resource for students, the "Mathematical Methods (CAS) Formulas" postcard.

You can order additional copies for your students at no charge.

Again in 2012, RMIT is offering teachers of mathematics the opportunity to have a free interactive presentation in Mathematical and Geospatial Sciences in their very own classroom.

RMIT representatives will come to your school and run a free session for your students (preferably year 10 and VCE students) on one of the following topics:

- Maths and Statistics in Sport
- Maps and Models

Arrangements can also be made for you to undertake a session on the RMIT City campus.

> **For more information and/or to order your free postcards phone 03 9925 2283 or email smgs@rmit.edu.au.**

www.rmit.edu.au/mathsgeo



S1162

2011 MAV conference

The 2011 MAV conference was terrific. Teachers gathered and absorbed two days of mathematics professional development. The feedback from the conference has been positive and if you would like to offer a suggestion, complement or criticism, email jallen@mav.vic.edu.au.

The Hon Martin Dixon, Minister for Education spoke at the conference and had this to say:

"It was a great honour to be able to welcome more than 2000 maths teachers from across Victoria, Australia and the world to the Mathematical Association of Victoria's 48th annual conference in December.

From my personal perspective, and as a former teacher and principal, it was incredibly inspiring to see so many maths teachers at the conference ready to learn from each other, challenge each other and share their unique ideas about the work they are doing in their classrooms to make maths education meaningful and fun.

The fact that more than 100 participants from around the globe, including China, New Zealand, the US, Singapore and Malaysia attended the MAV conference is testament to the quality of maths teaching in Victoria and highlights this state's international reputation for professional excellence.

The state government knows the greatest influence in getting students interested in and excited by maths is the teacher, which is why we have invested \$24.3 million in our new Primary Mathematics and Science Specialists

Initiative. Just days before the conference we were pleased to announce the first 100 specialists had been selected to work in 55 Victorian primary schools, including 60 maths specialists in 26 schools, from the start of 2012.

Over the next five years 200 specialists will work closely with thousands of classroom teachers to help them make maths lessons as creative and engaging as possible, to keep students learning maths at a senior school level and even propel them towards maths-related careers.

While we are always looking to improve maths education in Victorian schools, it's also important to acknowledge the amazing work so many of our teachers are already doing in classrooms right now and the MAV conference was a wonderful opportunity to highlight this outstanding work.

Congratulations to all those who attended and especially to the many people involved in organising and making the conference the wonderful success it was."

Dr Toh Tim Lam ran a session at the conference and is also on the conference steering committee.

"I am always encouraged to meet many Australian teachers and researchers at the conference, and also to meet each of the participants in my session. It's great that the discussion doesn't end at the conference, I often get emails on the issues that I present at the conference! I enjoy reading the MAV conference proceedings, it contains many interesting teaching ideas from different sessions."

Tamsin White attended the conference for the first time.

"I'm a graduate primary teacher about to take my first class of students in 2012 so I was keen to absorb as much information as possible to assist me in teaching maths effectively and confidently to my students. The sessions I attended helped me to do this, as well as showing me the importance of, and how to identify and address math-learning problems in my students.

The tutorial-style teaching of some of the sessions promoted group work which allowed me to network with other teachers and make some friends. We shared ideas, opinions and teaching and learning strategies, which gave me new perspective and confidence in my own teaching style and philosophies.

The conference atmosphere was fun, with well-catered morning tea, lunch and happy hour. In my education studies I read many maths texts and had the delight of attending sessions at the MAV conference of some of those authors and having the opportunity to speak with some of them in break times. A highlight was meeting George Booker!"

Save the date: the 2012 MAV conference will be held on 6 and 7 December.

MAV VCE PD

Meet the examiners

During 2012, the MAV will conduct a series of sessions where participants will have the opportunity to receive reports on the 2011 examinations in Further Mathematics and Mathematical Methods. The sessions will be conducted by experienced markers or examiners.

Teachers are invited to attend these focused and enjoyable PD sessions. Some issues that will be discussed include:

- what preparation is necessary for 2012 students
- what sorts of fundamental mistakes occurred in 2011
- what pitfalls to avoid and supporting teaching strategies
- detailed solutions to key questions from 2011
- feedback on candidates' performances

Attendance at *Meet the Examiners* will qualify as part of teachers' 20 hours professional development.

School Assessed Coursework evening

Get great ideas for your SACs for 2012. Separate lectures will be held for Specialist, Methods and Further Mathematics.

You will be provided with a disk containing data sets, sample documents and where necessary, instructions for use. These can then be modified to suit your students in your school.

Looking for lesson plans, activities, tutorials and support?

Visit <http://education.ti.com/australia> for the latest updates and resources



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VCEPD

SAC EVENINGS

WHEN	WHERE
Monday 20 February, 5pm – 7.30pm	Ballarat
Thursday 23 February, 5pm – 7.30pm	Moe (Maths Methods CAS)
Thursday 23 February, 5pm – 7.30pm	Shepparton
Monday 27 February, 5pm – 7.30pm	Moe (Further Maths)
Monday 27 February, 5pm – 7.30pm	Northcote
Tuesday 28 February, 5pm – 7.30pm	Moe (Specialist Maths)
Wednesday 29 February, 5pm – 7.30pm	Burwood

MEET THE EXAMINERS

WHEN	WHERE
Tuesday 20 March, 5pm – 7pm	Horsham
Monday 26 March, 5pm – 7pm	Williamstown
Wednesday 28 March, 5pm – 7pm	Geelong
Monday 16 April, 5pm – 7pm	Moe (Further Maths)
Tuesday 17 April, 5pm – 7pm	Burwood (Maths Methods CAS)
Wednesday 18 April, 5pm – 7pm	Burwood (Further Maths and Specialist Maths)
Thursday 19 April, 5pm – 7pm	Moe (Maths Methods CAS)



TO REGISTER
WWW.MAV.VIC.EDU.AU/PD
 OR CALL +61 3 9380 2399

Footy tipping...it's that time again!

"Dad, I'm not messing around. This footy tipping game is part of my maths homework!"

The first MAV footy tipping league was run in 2011. The winner, from an initial starting pack of 99, was Sam Kelly. Since then, the team at Score Five Footy, led by SportZstats inventor and AFL legend Peter Daicos and Chartered Accountant, Nigel Reid, have reworked and upgraded the MAV league game.

It's now a unique, maths education oriented footy tipping competition for students, teachers and parents to enjoy. It's a game that will encourage more analysis by students to amass extra individual points. The 2012 game also allows for individual, class vs class and school vs school head to head battles. There are great individual and school prizes up for grabs.

Learning should be fun

"The new website helps students learn about and master various mathematical topics, concepts and skills. They are encouraged to mine and analyse the website's footy data to play the tipping game using the knowledge they've gained," says Reid "It's a fun and healthy competitive game. Players can win great prizes for themselves and for their schools!"

The Score Five MAV game recognises that students learn best when they are having fun and when they have more than a passing interest in what they are doing. By using students' natural drive of competition and footy tipping, they are able to connect with maths concepts such as

percentages, pie charts, graphs and averages using real data and by making real life connections.

Students will be able to use the knowledge they obtain from analysing the data that is updated weekly to their advantage when tipping. The website also features helpful, additional basic online tuition for students to access (to be used in conjunction with teacher focused learning). These are designed to help students further get to grips with individual topics.

Real footy stats trump mythical data

Teachers will be able to take advantage of the enthusiasm their students will display to break down barriers associated with data analysis.

By using real life examples students will be able to connect with the topics with greater ease and therefore obtain a greater understanding of the concepts covered. This should lead to improved learning outcomes.

A private teachers' blog function (launching in early March 2012) is being built in to promote a sharing of training materials, ideas and best practices within the playing teachers community.

How can you sign up?

You can sign up now at www.MAVfooty.com. Participation is free.

I knew I'd have to come up with something special when I signed up to compete against other mathematics teachers and students in the MAV footy tipping comp. Not even the most complicated algebraic equation could predict a winner, and if it could then it definitely couldn't tell you the margin of an AFL game.

That is the beauty of the Score Five tipping site. The three dimensional tipping system forces you to pick the winner, a margin range and a banker who must win. With points assigned to the accuracy of your predictions, it's the ultimate test of a footy 'expert'.

- Sam Kelly, 2011 footy tipping competition winner, Trinity College Colac

Maths is out there. Everywhere.

Ellen Corovic - MAV Professional Officer

Over the past few months I have been reviewing the maths programs, trails and excursions that are available in and around Melbourne and Victoria.

Throughout 2012, the plan is to reinvigorate our MAV resources so that teachers have access to innovative and contemporary rich mathematical tasks that can engage students with mathematics in the real world. To take students beyond the classroom.

MAV is aiming to produce

- engaging and interactive *Maths Trails* (both in Melbourne and around Victoria)
- a list of innovative and current mathematics excursions.

If you would like to be involved in developing mathematics outside of the classroom or if you have any ideas of places you'd like to see a *Maths Trail* created, please email ecorovic@mav.vic.edu.au or telephone 9380 2399.

MAV have had several enquiries from teachers requesting mathematics based integrated learning units. If you have, or know of one, and would like it to be published on our website for sharing, email ecorovic@mav.vic.edu.au. Any units will be duly recognised as your/your schools work.

MAV is aiming to extend our range of practical mathematical resources for our members to use and implement within their classrooms and schools.

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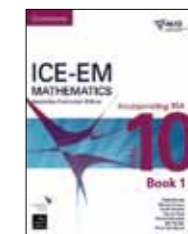
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Differentiating mathematics teaching

Dr Ian Lowe - MAV Professional Officer



The job of every teacher is to maximise the learning of all learners. Few teachers remain to be convinced that one of our greatest challenges is to do this, given that students arrive at school already differing in attainment by several years, and this spread increases throughout primary and secondary school. Extensive research, as well as many on-demand tests, supports this.

The first reaction is to try to keep students all together, doing all we can to minimise the spread of attainment. This seems the most efficient way to operate, if the goal of the exercise is delivery of content. So we teach to the middle, where most of the students seem to be.

However the evidence shows that many students are left behind and many more are cruising, finding no challenge and even losing interest. Experience tells us that teaching does not guarantee learning.

The second response is to want to help those behind to catch up. This is a noble idea, but doomed to failure, since while some are catching up the others are getting even further ahead. This is often attempted through streaming or setting, where students are grouped by ability.

The MAV's response is to assist a classroom teacher of the typical mixed-attainment class to use two approaches to meeting the diverse learning needs and differing learning styles.

1 Open-ended investigations for the whole class are designed to have multiple entry points and multiple exit points, thus catering for all. But above all they are designed to work well with mixed-level groups, where all students help one another, and learn by comparing their solutions. (These are not just middle-level tasks, tweaked to be simpler or more advanced.) Victoria and Australia have considerable experience in these investigations through RIME, RIME 5&6, MCTP and the ever-growing Maths300.

2 For each topic, students are grouped for targeted teaching to their level. Again Victoria has considerable experience in providing guidance for teachers in assessing student

needs and learning activities designed to assist the teacher to meet those needs. Examples are the Assessment for Common Misunderstandings, Scaffolding Numeracy in the Middle Years, and the Mathematics Developmental Continuum.

While instruction is being given to one group, other groups need to be occupied in reinforcing activities, using worksheets, hands-on activities, problem-solving tasks and ICT. Once again Victoria has a wealth of good material available for this. Much of it is from MAV or the Mathematics Centre, Learning Objects (FUSE or Scootle) and the internet. The challenge for teachers, who are aware of all these valuable resources, has been to organise them around the curriculum of the day, and make them accessible easily.

MAV's secondary professional officer, Dr Ian Lowe, has taken on this task, producing books and CDs. The CDs were known as *Teach Maths for Understanding*, which were distributed annually to MAV members as a free member benefit. The CD organised differentiated unit plans for all VELs levels (Prep to Year 10) with hyperlinks to many useful resources. Many schools have used them by adapting them to their own needs. For schools still using VELs in 2012, the contents of the 2011 CD is still available from MAV by download.

This year MAV won't be producing a *Teach Maths for Understanding* CD. Instead, the updated content is accessible online at tm4u.mav.vic.edu.au. Again, this is a resource exclusively for MAV members, so make sure you have renewed your MAV membership.

The content is organised based on the Australian Curriculum: Mathematics. There are many hyperlinks to free resources, and links to MAV CDs. The website works best if you have purchased the CDs that *Teach Maths for Understanding* points to. For those schools who have purchased these, the content will automatically download from the MAV website when you click on a relevant link.

Give it a try: tm4u.mav.vic.edu.au.
MAV would love to hear your feedback on the web version. Email feedback to office@mav.vic.edu.au.