

# MORE GIRLS CHOOSING MATHS? YES PLEASE!

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Every child starts school with the potential to succeed in mathematics.

At the Australian Mathematical Sciences Institute (AMSI), we think of mathematics as a pipeline through school, tertiary education into the workplace. Different factors choke output at points along the pipeline with the result is that Australia is experiencing a period of fewer maths graduates and fewer Science, Technology, Engineering and Mathematics (STEM) capable citizens.

Let's talk about the impact of the mathematics shortage. As well being as useful skills for life in general, STEM skills are critical for Australia's national productivity and global competitiveness. Australia has reached a critical point where capitalising on economic opportunities for future generations requires intervention and innovation to ensure they have the right skills for fulfilling careers and a healthy, sustainable economy. If more girls chose mathematics, we could go some way to addressing the shortage.

According to data gathered by AMSI, 10% of Australian Year 12 students participated in advanced mathematics in 2014 and 19.3% in intermediate mathematics. Participation rates for girls are particularly poor with only 6.8% enrolled in advanced maths and 18.2% in intermediate, compared with 13.4% and 20.6% for boys.

Is the removal of pre-requisites for tertiary study the cause for the decline? Or could it be that students, parents and teachers just don't see a clear career path for the mathematically capable? And why do girls participate at a much lower rate than boys?

We should also be asking where the maths teachers are. Australia does not have a full complement of qualified secondary mathematics teachers. Of the students in Years 7 to 10 in Australian schools, 40% are being taught by teachers who are 'teaching out of field'.

AMSI has partnered with the BHP Billiton Foundation to address just these issues, with strategies across the mathematics pipeline to be implemented over the next four years. The program is designed to entice more girls and young women into mathematics.

## TEACHER PROFESSIONAL DEVELOPMENT

Teacher Professional Development will be delivered on-the-ground in 120 Australian schools. Based on a cluster arrangement, where a secondary school and up to three of its feeder primary schools are formed into a professional development group, teachers will work with an AMSI Specialist to focus on enhancing content knowledge in mathematics. The schools in Choose Maths regions have begun this important work with the seven AMSI Choose Maths Outreach Officers.

## WOMEN IN MATHEMATICS CAREER AWARENESS CAMPAIGN

A national public-awareness campaign will help students their teachers, parents, and the public see that rewarding and interesting careers exist for people who 'stick with maths'. Material is currently under production, and will be sent to every school in Australia.

## INSPIRING WOMEN IN MATHEMATICS INITIATIVE

Drawing on the community of mathematical high achieving women and men currently working in industry and business, Choose Maths will introduce young women to role models who have achieved in STEM and also possess the ability to translate their experience for the audience.

We are gathering profiles of amazing mathematicians – this will be a valuable resource for students, parents and teachers.

## THE BHP BILLITON FOUNDATION AWARDS FOR EXCELLENCE IN THE TEACHING AND LEARNING OF MATHEMATICS

Teachers are very good celebrating their students' achievements, but are seldom celebrated for their own. The Choose Maths program will recognise teachers of maths by initiating the Annual BHP Billiton Foundation Awards for Excellence in the Teaching of Mathematics.

The Student Awards will reward student teams who will produce an accurate and innovative video that explains an area of mathematics.

## STUDENT AWARDS

The Choose Maths student awards provide the opportunity to acknowledge student achievement in communicating their love of mathematics. Students will collaborate in small teams to create videos around this year's theme 'Maths is more than just numbers'. The winning teams will receive prizes ranging from \$1000 to \$2000.

Encourage your students to get creative and bring their love of mathematics to life on film – head to [choosemaths.org.au](http://choosemaths.org.au).

## TEACHER AWARDS

Do you know an outstanding teacher of mathematics? One who has successfully mentored girls in mathematics?

The teacher awards include a number of categories with the major prizes awarded to two teachers who have impressed with their outstanding achievement in inspiring and fostering the participation of girls in mathematics. The top two awardees will each receive \$10,000 prize money and an additional \$10,000 to support their school mathematics program. Additionally, eight of Australia's leading mathematics teachers will each receive \$1000 and with an additional \$1000 for their school mathematics program.

## REFERENCES

Edwards, Daniel and Smith, T Fred, (2008) Supply, demand and approaches to employment by people with postgraduate research qualifications in science and mathematics: Final Report [Available: [http://research.acer.edu.au/higher\\_education/9](http://research.acer.edu.au/higher_education/9)]

Discipline profile of the mathematical sciences 2013, Australian Mathematical Sciences Institute (AMSI), 2014 [Available: [amsi.org.au/disciplineprofile2015](http://amsi.org.au/disciplineprofile2015)].

Go to [choosemaths.org.au](http://choosemaths.org.au) to nominate an engaging and innovative teacher who possesses the qualities that help girls to choose maths.

# LAURA CHOSE MATHS



## LAURA CHEMICAL ENGINEERING STUDENT - RMIT

I chose Chemical Engineering because I wanted to do a course that had both maths and science subjects as well as hands on work experience. On an average day at uni I can be doing anything from differential equations to designing water purification plants or making paracetamol in my chemistry classes. I like how the course isn't just about research and theory. It's how you apply the maths and science concepts to the real world, which is really exciting.

After Year 11, I knew I had to study Maths Methods as a prerequisite, and to keep my options open, but I didn't know whether I'd be able to keep up with the workload.

Day one of Year 12 Maths Methods was with Ms Deylen, and I knew everything would be ok. Ms Deylen encourages everyone and makes all of her students feel like they can achieve great results, even on those days when nothing clicks, the numbers come out all wrong and

you want to give up, but with Ms Deylen giving up was not an option! She'd give up lunch times, after school hours and days in the holidays to answer questions. She kept believing that everyone in our class was capable until we started believing it ourselves!

Maths is a lot of hard work but it's definitely worth it and gives you a greater choice of courses at the end of school.

## JACINTA DEYLEN MATHEMATICS TEACHER SANTA MARIA COLLEGE

I have been teaching high school maths for over 30 years and I love it! I love working with people of all ages and being part of a team where we all use our strengths to enhance student learning as well as continue to work on areas that need developing. That for me is what teaching is all about. I enjoy working with other teachers and sharing ideas to help the students in our care flourish. I genuinely really care about all of my students. I want the best for them. I enjoy helping them,

guiding them, challenging them and sharing a maths journey with them.

I have a genuine interest in how all my students are coping with the maths content. I always try to have a few hints to help them out or for those who need a challenge, something to ponder. Some students may not do well in tests but have great reasoning and problem solving skills. So it's important to encourage these students to continue with their fine efforts – they often underrate themselves.

For me, every day is different. It is exciting, challenging and very much people orientated. Like most teachers I am hooked on my students having those 'oh ah' or 'light bulb' moments when everything finally makes sense. It really makes the job worthwhile.

Mathematics is everywhere! It is a universal language so having maths as one of the subjects studied in Year 11 and 12 will open doors for future choices, courses and careers.