

Senate Committee: Education and Employment

QUESTION ON NOTICE Budget Estimates 2015 - 2016

Outcome: Higher Education Research and International

Department of Education and Training Question No. SQ15-000390

Senator Carr, Kim provided in writing

STEM

Question

What programs are currently operating within the Department that deal especially with STEM and its promotion throughout secondary schools and universities? Please provide a breakdown of each program together with each programs outcomes in terms of student enrolments, student attainment levels etc (whatever the measured statistics may be)?

Answer

The current secondary schools and higher education programs operating within the department that deal with STEM are listed below together with their outcomes.

Programme name	Outcomes
Enhancing the Training of Mathematics and Science Teachers Programme	<ul style="list-style-type: none">• Each project funded under the Programme has agreed deliverables with the department. There are no student metrics.
Advice and Support for Teachers of Science and School Laboratory Technicians (2012–13 to 2015–16)	<ul style="list-style-type: none">• Provides advice and support for science teachers and school laboratory technicians including standard operating procedures, sample risk assessments and teaching resources• As at 28 February 2015 there were 420 linked resources on the Science ASSIST website• In late 2014 four pilot professional development workshops introducing the Science ASSIST website and Connected Learning Experiences on the website were held. Ninety-six teachers from 53 different schools attended.
Advice for Teachers of Mathematics (2012–13 to 2015–16)	<ul style="list-style-type: none">• Development and delivery of advisory services for mathematics teachers through the following online communities:<ul style="list-style-type: none">- 1) Make it count with Indigenous Learners launched 2013- 2) Early Years Learning in Mathematics launched 2013- 3) Maths in Action launched 2014- 4) Engaging All Students launched 2014- 5) Digital learning and mathematics to be launched in July 2015.• Over 2300 teachers are participating in the online communities.
Coding across the curriculum (2014–2018)	<ul style="list-style-type: none">• Development and curation of high quality resources aligned to the Australian Curriculum• The initiative aims to students developing skills in problem solving, algorithmic thinking and computational thinking• Building of a one-stop-shop online resource repository will begin in July 2015.
Establishing a 'Pathways in Technology Early College High School' (P-TECH) styled education facility	<ul style="list-style-type: none">• In the US, the P-TECH model provides Years 9–14 education that aligns STEM learning with associate degrees in applied science• Seed funding is being provided to test and adapt elements of the P-TECH model in the Australian context.

Programme name	Outcomes
Mathematics and Science Illustrations of Practice (2012–13 to 2014-15)	<ul style="list-style-type: none"> • Creation of a minimum of 70 minutes of online videos per year which illustrate the Australian Professional Standards for Teachers in action in science and mathematics • Videos seek to illustrate the standards in practice and to promote high-quality teaching in science and mathematics classrooms • 48 illustrations are available and an additional nine videos are in production.
Mathematics by inquiry (2014–2018)	<ul style="list-style-type: none"> • Development of mathematics curriculum resources for primary and secondary school students. • Resources are to support an inquiry-based pedagogical approach to the teaching of mathematics.
Mathematics Olympiads (2013-14 to July 2016)	<ul style="list-style-type: none"> • A minimum of one extension programme for secondary school students in mathematics and informatics • Facilitate participation in the international mathematics and informatics Olympiads by designated student teams in 2013, 2014, 2015 and 2016 • Conduct a residential school for each Olympiad programme each year from which the Olympiad teams are selected.
Science Connections (2012–2018) - includes Primary Connections: Linking science with literacy (2014–2018) and Science by Doing (2016–2018)	<ul style="list-style-type: none"> • High quality student and teacher resources aligned to the <i>Australian Curriculum: Science</i> • Professional learning activities • Primary connections units are used in over 70 per cent of Australian Primary Schools • From 2014–2018 a minimum of 700 primary school teachers will be a provided with a training workshop.
Science Olympiads (2013–14 to July 2016)	<ul style="list-style-type: none"> • A minimum of one extension programme for secondary school students in each of the science Olympiad subjects – physics, chemistry and biology • Facilitate participation in the international science Olympiads by designated student teams in 2013, 2014, 2015, and 2016 • Conduct a residential school for each Olympiad programme each year from which the Olympiad teams are selected.
Scientists and Mathematicians in Schools programme (SMiS) (2012–2016)	<ul style="list-style-type: none"> • SMiS links practising scientists, mathematicians and ICT professionals with classroom teachers • As at 31 March 2015, 1677 scientists and mathematicians were partnered with teachers and schools • Over 4429 partnerships have been created since SMiS commenced in July 2007.
Summer schools for STEM students (June 2015–2018)	<ul style="list-style-type: none"> • Initiative seeks to improve the capabilities of participants from underrepresented cohorts in the STEM learning areas • Minimum of 54 students per year to participate in the extension programme which includes a summer residential workshop; mentoring for a minimum period of five months and a winter residential workshop.
Support for Maths Enrichment Activities in the Northern Territory (2013–2016)	<ul style="list-style-type: none"> • Conduct one Maths Enrichment Camp in the top end and one in central Australia per year • Minimum of 30 students to participate in each camp • Conduct after school Maths Enrichment programmes two or three times a year for up to 420 students in the Northern Territory.
Australian Mathematical Sciences Institute (AMSI) Vacation Schools and Scholarships project	<ul style="list-style-type: none"> • A Winter school for Australian domestic PhD students, recent PhD graduates, and masters and honours students that supports participants to build research networks, broaden mathematical sciences technical skills • A 'BioInfoSummer' symposium for Australian domestic PhD students, recent PhD graduates, and masters and honours students in biological sciences and or mathematical sciences and introducing participants to state of the art bioinformatics research

	<ul style="list-style-type: none"> • Vacation Research Scholarships, providing undergraduate students with mathematical sciences research experience; preparation for honours or masters years and encouragement to continue to study a PhD • Summer school for undergraduate students, providing condensed short courses on mathematical sciences topics informed by national and industry needs • School student engagement demonstrating mathematical sciences education pathways and researcher careers to school students • The development of mathematical sciences participation strategies for Aboriginal and Torres Strait Islander students, female students and students from low socio-economic backgrounds • In 2014, 333 students participated in AMSI activities.
<p>Australian Maths and Science Partnerships Programme (AMSPP)</p>	<ul style="list-style-type: none"> • Build theoretical and pedagogical skills of teachers to deliver maths and science subjects • Increase the number of school students undertaking maths and science subjects to Year 12 • Improve the outcomes of these students • Encourage more students to study science, technology, engineering and maths courses at university through innovative partnerships between universities, schools and other relevant organisations • Under the AMSPP outcome measures vary across projects depending on the nature of activities conducted • For example, the following projects measure the number of secondary schools participating, workshops held and the number of students and teachers that attended. As at 30 March 2015, University of Sydney's 'CAASTRO in the Classroom' project had four secondary schools, 250 students and five teachers engaged. Four workshops have been held with 250 students and five teachers attended. The University of Tasmania's 'Out of the Wilderness' project had 31 secondary schools, 925 secondary students and 38 teachers participating. A total of 36 workshops have been held and 1358 students and 36 teachers attended. The Royal Melbourne Institute of Technology's 'Reframing Mathematical Futures' had 32 secondary schools engaged and 1500 students and 44 teachers participated. One workshop has been held and 44 teachers attended • A number of products/resources had been developed through the projects including web based, e-technology and classroom based. As at 30 March 2015, Southern Cross University's 'Inspiring Science and Mathematics Education' had developed 5 web based, e-technology and classroom resources. The Royal Melbourne Institute of Technology's 'Virtualising Science' had developed 12 classroom based resources and the University of Sydney's 'Embedded System Design Challenge' had developed four web based resources.