

Victorian Government Response to the Parliamentary Education and Training Committee Inquiry into the promotion of mathematics and science education.

Recommendation	Government Response	Response Type
<p>Recommendation 2.1: (page 36) That the Victorian Government define the future direction for mathematics and science education in Victoria, through a strategic statement outlining:</p> <ol style="list-style-type: none"> i. The purpose and goals for mathematics and science education in Victorian schools; ii. Principles for curriculum and assessment development and implementation; iii. Strategies for increasing engagement and participation in mathematics and science education, training and employment pathways; iv. Strategies for intervention for lower achieving students and for raising achievement among the entire student cohort; v. Strategies for improving the quality of teaching in mathematics and science; and vi. Strategies and programs for an enhanced role for industry in mathematics and science education. 	<p>The Government supports this recommendation.</p> <p>The Department of Education and Training, in partnership with other Government departments, will develop a mathematics and science education strategy.</p> <p>The strategy will:</p> <ul style="list-style-type: none"> • Clearly articulate the purpose and goals for mathematics and science education in Victorian schools and provide a common frame of reference for all mathematics and science education stakeholders, i.e. Government departments, resource developers, teacher educators, teachers, students, parents, business, industry and the broader community; • Facilitate the strengthening and better targeting of mathematics and science education initiatives to improve the quality of school curricula, teacher practice and student engagement and outcomes; • Facilitate the targeting of science and mathematics education to current and future workforce needs of the industry and research sectors; and • Facilitate the establishment of processes and procedures to improve coherence between the activities of Government departments with an interest in mathematics and/or science. <p>The Department of Education and Training and Victorian Curriculum and Assessment Authority have led significant curriculum reform in the last 12 months through the development and implementation of the Victorian Essential Learning Standards. The Department has also provided additional support and resources for teachers to assist them in areas of curriculum planning and development, teaching and learning practices and assessment and reporting procedures.</p> <p>The Department of Education and Training has already recognised the importance of Maths and Science by refocusing the work of Phase 1 and 2 Schools for Innovation and Excellence clusters to build teacher knowledge and teaching capacity in these areas in 2006/07.</p>	<p>2</p>

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<p>Recommendation 3.1: (page 58) That the Victorian Government raise with the Ministerial Council on Education, Employment, Training and Youth Affairs, in consultation with the industry, business and research sectors, the need for national consistency in the content and naming of senior mathematics subjects.</p>	<p>The Government notes this recommendation.</p> <p>All States and Territories have their own quality senior mathematics subjects which form part of their respective senior secondary certificates. Each of these certificates is accredited under the Australian Qualification Framework. Australian Qualification Framework accreditation helps to provide a nationally consistent recognition of outcomes achieved in post-compulsory education and provide an appropriately rigorous quality assurance mechanism.</p> <p>Through MCEETYA, Victoria is leading a project which will examine the feasibility of a:</p> <ul style="list-style-type: none"> • common scale for reporting all senior secondary subject results; and • quality assurance mechanism which would ensure consistency of results of senior certificates across Australia. 	<p>2</p>
<p>Recommendation 3.2: (page 73) That the Department of Education and Training, in partnership with the Victorian Curriculum and Assessment Authority and other relevant stakeholders reconsider the existing suite of VCE science courses and investigate the merits of introducing:</p> <ul style="list-style-type: none"> • A contemporary general science and science communication subject; or • An applied or engineering-based science subject. 	<p>The Government does not support this recommendation.</p> <p>A general science subject was most recently offered in the 1990s and attracted very few students.</p> <p>The Victorian Curriculum and Assessment Authority has already embarked on a process to consider and develop strategies to review Victorian Certificate of Education studies that are related or can be grouped together, for example, studies such as Systems Engineering, VET Electrotechnology and VCE Physics;</p> <p>The Victorian Qualifications Authority and the Post Compulsory Division of the Department of Education & Training are working with the Victorian Curriculum and Assessment Authority in the project to review the Victorian Certificate of Applied Learning. This review will investigate whether there is a demand for a science-focussed program in the certificate that could act as a pathway to further vocational education and careers in science, for example at technician level.</p>	

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<p>Recommendation 3.3: (page 78) That the Department of Education and Training revise existing summative assessment tools to ensure they measure and promote student understanding and students' ability to apply their mathematics and science knowledge.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>The Department of Education & Training has identified a need for improvement in teacher pedagogy related to assessment and addresses it generically in the <i>Principles of Learning and Teaching</i> initiative of the <i>Blueprint for Government Schools</i> Flagship Strategy 1, and more specifically for science and mathematics in the <i>School Innovation in Teaching – science, mathematics and technology</i> program.</p> <p>Further to this, the Department of Education & Training has developed and provided to schools comprehensive assessment advice, 'for, as and of' learning, consistent with the latest educational research. The Department has also recognised the lack of summative assessment tools outside the Victorian Certificate of Education and is currently developing an online item bank which will provide teachers of Years 3-10 students with both formative and summative assessment tools.</p> <p>The Victorian Curriculum and Assessment Authority has developed an online science and mathematics On Demand Testing facility. The science component of this resource has the potential to be made more comprehensive and to be more widely promoted.</p>	<p>2, 4</p>
<p>Recommendation 3.4: (page 79) That the Victorian Government include as part of the Achievement Improvement Monitor, the assessment of achievement and progression of students in science.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>An existing alternative national strategy for assessing student outcomes, to eventually replace the Achievement Improvement Monitor (AIM), continues to be developed.</p> <p>While the Victorian Curriculum and Assessment Authority has the technical capacity to develop a science test for the Achievement Improvement Monitor, this assessment device is to be phased out as the triennial <i>National Assessment Project</i> develops.</p> <p>The Department of Education, in partnership with the Victorian Curriculum and Assessment Authority, will investigate further possible avenues for the assessment of achievement and progression of students in science. This will include considering the use of current assessments such as the Primary Science Assessment Project (Year 6) and the Trends in International Mathematics and Science Study (TIMMS) at a statewide level in Victoria.</p>	<p>2, 3, 4</p>

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<p>Recommendation 4.1: (page 97) That the Victorian Government undertakes an analysis of enrolment trends against forecast future workforce requirements and develops benchmark targets for Year 12 enrolments in the enabling science subjects (physics, chemistry and advanced mathematics).</p>	<p>The Government does not support this recommendation in principle but will investigate further.</p> <p>The Department of Education and Training is intending to investigate ways of collecting enrolment data as part of the development of a mathematics and science strategy and therefore is in agreement with part of this recommendation regarding the importance of and necessity to collect enrolment trend information.</p> <p>The Department of Education & Training, however, does not believe that developing benchmark targets for Year 12 enrolments in the enabling science subjects (physics, chemistry and advanced mathematics) will prove an effective strategy in having more students studying science.</p> <p>The Department of Education & Training believes that more proactive measures are needed to encourage students to enrol in enabling science subjects. These measures will be investigated as part of the development of a mathematics and science education strategy.</p>	2
<p>Recommendation 4.2: (page 97) That through the Ministerial Council on Education, Employment, Training and Youth Affairs, the Victorian Government work with the Commonwealth Government and other State and Territory Governments to ensure the funding and allocation of university places in mathematics and science related disciplines are sufficient to meet industry and community needs.</p>	<p>The Government supports this recommendation.</p>	2
<p>Recommendation 5.1: (page 123) That the Victorian Government undertake an analysis of comparative success of interstate and international mathematics and science education and awareness programs in engaging and assisting students from diverse backgrounds.</p>	<p>The Government supports this recommendation.</p> <p>This work will be included in the development of a mathematics and science education strategy.</p>	2

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Recommendation 6.1: (page 157) That the Victorian Government develops strategies aimed at improving the participation and performance of students from lower socio-economic backgrounds in the enabling sciences (physics, chemistry and advanced mathematics) to that of the overall student cohort.	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>The Department of Education & Training has strategies, both existing and in development, that are designed to support to students from lower socio-economic backgrounds. This work will be included in the development of a mathematics and science education strategy.</p>	<p>2, 4</p>
Recommendation 6.2: (page 157) That the Victorian Government work with university-to-school mentoring programs to ensure they are better targeted towards achieving improvements in mathematics and science attainment levels, especially within schools: <ul style="list-style-type: none"> • That are located in areas of relative socio-economic disadvantage; • That perform lower in national and/or international benchmarking studies; • That have lower levels of educational attainment; and/or • That have student groups that traditionally have lower levels of educational attainment, including students in rural communities, Indigenous students and students from some language backgrounds other than English. 	<p>The Government supports this recommendation.</p> <p>A review of existing university-to-school mentoring programs will be included in the development of a mathematics and science education strategy.</p>	<p>2</p>

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<p>Recommendation 6.3: (page 157) That the Victorian Government review the specific needs of rural and regional students in gaining equitable access to a range of mathematics and science education, awareness and enrichment programs and devise strategies to overcome geographic disadvantage in mathematics and science education.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>The implementation of this recommendation requires the development of new strategies which could include:</p> <ul style="list-style-type: none"> • An analysis of cross region data by the Victorian Curriculum and Assessment Authority to establish a baseline of rural uptake of post compulsory science and mathematics studies; • The provision of incentives to encourage suitably qualified teachers to take up positions in rural and regional schools; • The development of new strategic partnerships with relevant organisations that provide targeted and effective outreach programs to stimulate the interest of students in science and mathematics related careers, for example, programs that facilitate the interaction of students with scientists and engineers; and • The development of an online resource to raise awareness of mathematics and science enrichment programs. <p>The adoption of any new strategies would need to be informed by a review of the effectiveness of existing strategies.</p>	<p>2, 4</p>
<p>Recommendation 6.4: (page 158) That the Victorian Government develops additional strategies to ensure that the mathematics and science curriculum and its implementation are gender inclusive. Particular areas of focus should include the use of gender inclusive content, language and role models within the curriculum and integration of learning technologies that respond to gender needs.</p>	<p>The Government supports this recommendation in principle.</p> <p>This work will be included in the development of a mathematics and science education strategy.</p>	<p>2</p>

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Recommendation 6.5: (page 158) That the Victorian Government trial an e-mentoring program involving the industry, business and research sectors to complement existing mentoring programs.	<p>The Government supports this recommendation.</p> <p>Implementation of this recommendation would make further strategic use of the strong relationships that exist between the Department of Innovation, Industry and Regional Development the industry and the business and research sectors.</p> <p>The Government's \$89.3 million VicSmart broadband initiative provides an ideal platform for ensuring the capability required for an e-mentoring program.</p>	<p>2, 5</p>

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<p>Recommendation 7.1: (page 175) That the Victorian Government pursue through the Ministerial Council on Education, Employment, Training and Youth Affairs, the development of a nationwide curriculum and teacher professional development initiative for secondary schools.</p>	<p>The Government notes this recommendation.</p> <p>The Department of Education & Training currently supports the development and implementation of a national science program, <i>Science by Doing</i> which will provide both professional development for teachers and learning experiences for students.</p> <p>States and Territories are responsible for delivering high quality curriculum in schools and teacher professional development programs.</p> <p>There are two key policy documents which drive the development of high quality curriculum and teacher professional development in Victoria. The Victorian Essential Learning Standards have been developed to describe what is essential for students to achieve from Years Prep to 10 in Victorian schools. They provide a whole school curriculum planning framework that sets out learning standards for schools to use to plan their teaching and learning programs, including assessment and reporting of student achievement and progress. The <i>Blueprint for Government Schools</i> outlines the Victorian Government's reform agenda. It includes strategies to improve teacher leadership capacity and new professional development initiatives to enhance teachers' classroom practise.</p> <p>At a national level, Ministers have agreed to Statements of Learning in English, maths, science, civics and citizenship and Information Communication Technology. The Statements of Learning are high level summary statements of outcomes in the key curriculum areas, designed to ensure consistency and commonality in learning outcomes. Professional Elaborations of each of the Statements of Learning are being developed which provide more detailed information to guide curriculum authorities when developing curriculum in these areas.</p> <p>Through the Improving School and Teacher Leadership Capacity Working Group MCEETYA:</p> <p><i>"[assures] the quality of teachers and teaching by ensuring that nationally consistent standards for graduate teachers are developed and embedded in requirements for teaching in all Australian schools"; and</i></p> <p><i>"coordinate[s] national collaboration to develop a consistent view of school leadership capabilities, and support the sharing of strategies and programs to develop those capabilities".</i></p>	<p>2</p>

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Recommendation 7.2: (page 175) That the Victorian Government pursue strategies to improve the quality of advice to young people and their parents to ensure that those pursuing vocational pathways undertake appropriate mathematics and science studies.	<p>The Government supports this recommendation.</p> <p>The Department of Education & Training has already identified this need and in response is currently developing a web-based Careers & Transition Resource.</p>	2
Recommendation 7.3: (page 187) That the Department of Education and Training, as part of a strategic statement for mathematics and science education (refer recommendation 2.1) develop a five-year plan for science laboratories and equipment in primary and secondary schools. The strategic plan should include: <ul style="list-style-type: none"> • Best practice guidelines for the design of laboratory facilities; • Best practice guidelines for the delivery of the school science curriculum within occupational health and safety and duty of care requirements; • Partnership strategies to facilitate appropriate sharing of science facilities and equipment; • Strategies to facilitate industry support for the provision of some specialised laboratory equipment; and • Strategies for ensuring students in rural and regional Victoria and in areas of socioeconomic disadvantage can access appropriate facilities and experience. 	<p>The Government supports this recommendation.</p> <p>This recommendation is consistent with the Government's <i>Building Futures</i> policy. Its implementation requires:</p> <ul style="list-style-type: none"> • The audit and review of existing guidelines for school laboratory and occupational health and safety advice. • Consultation with schools, Vocational Education and Training providers, business, industry, research organisations, government departments and occupational health and safety experts. • A review of the effectiveness of the existing science centres managed by the Department of Education & Training. • The development and provision of professional learning programs for teachers in relation to occupational health and safety and duty of care requirements. 	2

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<p>Recommendation 7.4: (page 187) That the Victorian Government fund a science 'equipment boost' for primary and secondary schools to encourage greater innovation, scientific practice and experimentation as part of the consolidation of the Victorian Essential Learning Standards in Victorian schools.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>Implementation of this recommendation requires:</p> <ul style="list-style-type: none"> i) The development of processes that include consideration of the priority needs of particular sectors, e.g. primary, rural and individual schools or school clusters, to determine funds allocation; ii) The development of guidelines for equipment purchase to ensure government priorities are met. iii) The development and provision of appropriate teacher professional learning programs to ensure the equipment is utilised to maximum effect. 	<p>2, 4</p>
<p>Recommendation 7.5: (page 192) That the Department of Education and Training develop and maintain an online resource detailing mathematics and science related excursions, incursions, competitions and award programs and other enrichment activities that are available to Victorian students.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>The Department of Education & Training has identified the need for such a resource and, as part of the <i>Blueprint for Government Schools</i> Flagship Strategy 1, is currently reviewing the enrichment activities available and plans to develop the online resource during the 2006-07 financial year.</p>	<p>2, 4</p>
<p>Recommendation 7.6: (page 200) That the Department of Innovation, Industry and Regional Development, in conjunction with the Department of Education and Training, host a triennial conference involving high-level representatives of the business, industry, research and education sectors. The conference should focus on:</p> <ul style="list-style-type: none"> • Showcasing recent advancements in the application of mathematics and science within the economy; and • Developing approaches for the effective integration of these applications into schools and learning communities. 	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>Implementation of this recommendation:</p> <ul style="list-style-type: none"> • Requires close consultation between the Department of Education & Training and the Department of Innovation, Industry and Regional Development; • Requires the strengthening of links between the education and business, industry and research sectors. • Presents an opportunity to link more closely with the conference programs of the science and mathematics teachers' professional associations and with other similar activities currently held, including those hosted externally to government 	<p>2, 4, 5</p>

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<p>Recommendation 8.1: (page 215) That the Victorian Government consider offering additional incentives to attract postgraduate entrants into teaching in the mathematics and science disciplines.</p>	<p>The Government supports this recommendation in principle pending further consideration.</p> <p>Current initiatives to date attract graduates and post graduates into teaching. They include:</p> <ul style="list-style-type: none"> i) The Department of Education & Training currently offers Teaching Scholarships up to the value of \$9,000 to attract teachers to vacancies in hard-to-staff geographical and subject areas. Mathematics and science graduates are encouraged to apply in their final year of teacher training; and ii) The Career Change Program has provided opportunities for suitably qualified professionals with relevant experience to become teacher trainees in hard-to-staff Victorian Government schools. In particular, applications were sought from engineers, scientists, mathematicians and information technology staff. 	<p>2, 4</p>
<p>Recommendation 8.2: (page 217) That the Victorian Government pursue through the Ministerial Council on Education, Employment, Training and Youth Affairs, strategies that result in sufficient teacher education places being allocated within priority disciplines such as mathematics and science.</p>	<p>The Government supports this recommendation.</p>	<p>2</p>

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<p>Recommendation 8.3: (page 220) That the Victorian Government pursue through the Ministerial Council on Education, Employment, Training and Youth Affairs a review of student contribution charges, which currently act as a disincentive to qualification as a secondary mathematics or science teacher.</p>	<p>The Government notes this recommendation.</p> <p>At its meeting of 6 and 7 July 2006, MCEETYA considered a range of initiatives to encourage students to qualify as a teacher in difficult to staff curriculum areas. Student contribution charges, in the form of HECS, were examined as part of this. States and Territories endorsed the HECS cap for all teacher education courses and agreed that University funding agreements should support the current HECS cap for all teacher education courses irrespective of their level and discipline make up, without disadvantaging universities. While the Victorian Government recognises the value for students of capping HECS for teacher education courses, it believes that this approach should only be undertaken if the Commonwealth provides supplementary funding to universities so that the quality of teacher education courses is not compromised. The Victorian Government will continue to support initiatives to encourage students to enrol in and complete teacher education in hard to staff curriculum areas, including maths and science, through MCEETYA.</p>	<p>2</p>
<p>Recommendation 9.1 (page 244) That the Victorian Institute of Teaching consider and develop an appropriate model of mandated professional development for Victorian teachers, particularly mathematics and science teachers, whose disciplines face rapid advancement.</p>	<p>The Government supports this recommendation.</p> <p>The need to mandate professional learning has been identified by the Victorian Institute of Teaching. The Institute has recently determined that all teachers, including mathematics and science teachers, will undertake a mandated quantity and scope of professional development activities to meet the requirements for renewal of teacher registration and is developing a model for implementation in 2008.</p>	<p>6</p>

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