



YuMiDeadly
Growing community
through education

YUMI DEADLY MATHS

P-12 SCHOOL PROJECTS FOR 2016 AND BEYOND

Working with your school to improve mathematics teaching and learning

The **YuMi Deadly Centre** (YDC) at QUT is a research centre dedicated to enhancing the learning of all students to improve their opportunities for further education, training and employment, and to equip them for lifelong learning. YDC has developed **three mathematics projects** for P-12 schools which are available from 2015 onwards. These cover the general teaching pedagogy, YuMi Deadly Mathematics (YDM), the remedial pedagogy, Accelerated Inclusive Mathematics (AIM), and the extension and enrichment pedagogy, Mathematicians in Training Initiative (MITI). A fourth option, Integrated School Mathematics (ISM), combines two or more of these projects into a program tailored individually to each school's needs.

1. YuMi Deadly Maths (YDM) Teacher Development Training (TDT): Years P-9

YDM is the mathematics pedagogy that underlies all YDC projects. It is based on big ideas, smooth sequencing and connecting mathematics ideas, and has a framework for teaching that starts with the students' reality, abstracts through body → hand → mind to mathematics and reflects back to reality. It focuses on the most powerful mathematics understandings. It is an investment to provide a sustainable program for your school and has been successful in schools since 2010.

Training covers teaching for all strands of Years P to 9 mathematics and is supported by online training modules. The pedagogy is appropriate for all year levels up to Year 12, the content covers Pre-vocational Maths, and training focuses on the year level knowledge that these teachers require.

YDM TDT is a two-year training project. In the first year, YDC runs six training days overviewing YDM and covering the *Australian Curriculum: Mathematics* content strands of Number and Algebra and, in the second year, six training days covering Measurement and Geometry, and Statistics and Probability. Over the two years, the training provides eight resource books and access to a QUT Blackboard website and is available for four teachers per school.

2. Accelerated Inclusive Maths (AIM): Years 5-9

AIM is an extension of YDM to provide a diagnostic and remedial mathematics pedagogy that is effective for teaching students who are achieving below their grade level. It provides a framework to accelerate the learning of these students so that they reach their age level.

AIM is based on materials and training that have been successful in a diverse range of Indigenous and low income schools. When implemented fully, AIM has enabled underperforming junior secondary students (Year 3 level and below at the start of secondary school) to gain understandings and confidence to be successful in Years 10-12 mathematics subjects (including Maths A and B).

AIM is based on 24 five-week modules that provide vertical sequences of activities and assessment tasks from Year 2 to Year 9 for every mathematics topic in these years. Teachers are trained to use the modules to diagnose difficulties in student learning and accelerate learning to where students can access Year 10 subjects successfully. For Years 7-9, if student performance is very low, AIM modules can replace regular maths teaching. If student performance is only moderately low, the modules can be used within the regular maths classes to accelerate the learning of particular topics. In the latter case, schools can use the modules to develop Years 7-8 programs to accelerate learning to enable access to mainstream Year 9 mathematics.

AIM is a three-year training project with six days of PL per year. However, as it is based on YDM, **AIM can be delivered to schools across two years for an extra six days training per year if the schools are also receiving YDM** (see fourth option YDM ISM). Overall, AIM training provides 24 modules, a booklet that overviews the pedagogy, and 18 training days, and online support (available end of 2016).

3. Mathematicians in Training Initiative (MITI): Years 5–12

MITI is an extension of YDM that aims to enrich and extend the mathematics ability of students through the development of mathematics pedagogy and materials designed to go beyond the Australian Curriculum and prepare students for higher level mathematics. To do this, the MITI pedagogy is designed to enable deep learning of powerful mathematics. Its purpose is to develop confidence, motivation and knowledge with respect to mathematics in order to increase participation in higher level courses in senior years (e.g. Maths A, B and C) and improve university entrance numbers.

Although aimed at the more able students, MITI materials have been trialled in a variety of classes and been found to be of benefit to all students. Many teachers are using the materials with lower performing students to provide enrichment as well as with special high performing classes.

In the first year, MITI training covers Years 7 to 9 and focuses on pedagogy that assists teachers to use normal classroom situations to enrich and extend the learning of mathematics, and to prepare **open-ended motivating investigations** to add to the curriculum.

In the second year, MITI training focuses on teaching Years 7–10 students in ways (including technology) that facilitate easy transition to Years 11–12. In the third year, MITI looks at deep learning pedagogies that

develop future-oriented applications. This encourages thinking and technology use that facilitates understanding of high-level Years 11–12 mathematics.

Overall, MITI is a three-year project providing 45 exemplar investigations for Years 7–9 in the first year, a collection of transitional teaching ideas for Years 7–10 in the second year, and a collection of future-oriented applications for ideas and resources for teaching Year 10 and supporting Maths B and C in Years 11–12. It provides six days of PD per year. As it is based on YDM, **MITI can be provided to schools in two years if it is combined with YDM** (or both YDM and AIM) – for further details refer to the project below.

4. Integrated School Mathematics (YDM ISM): Years P–12

YDM ISM is a combination of two or all three projects above (YDM TDT, AIM and MITI) **integrated and tailored to the particular needs and objectives** of each school. Schools taking up YDM ISM receive **all training and materials** for more than one project in an integrated approach covering both primary and secondary as needed by the school.

Ideally, the YDM ISM project is structured across two and a half years as follows: (a) a term at the start of the project for the school and YDC to develop a plan unique to the school and to begin overall training; (b) a term at the end of the project for the school and YDC to set up sustainability processes within the school at the end of YDC's involvement; and (c) two years of training in YDM, AIM and/or MITI in between.

The duration of the project can be reduced to the basic two years of training or extended to three or more years depending on each school's preference.

This integration of the three projects provides a strong base for growth across Years P to 12.

We can work with you to tailor a program to meet your school's needs

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