

Maths Inside

Module: Teacher Professional Development Workshop 1

Information for facilitators

The “Maths Inside” project is developing resources to help teachers bring maths to life for high school students, addressing the problem of dwindling numbers of learners taking advanced maths and science in schools and university study. The project is led by a UTS team working in collaboration with AAMT and CSIRO.

# About this module

**This resource was developed by**

Dr. Marco Angelini, Dr. Mary Coupland and Assoc. Prof. Anne Prescott

**It is suitable for**

Teachers of students in years 8 to 12

**The resources for this module include**

Facilitator notes

Session slides in PowerPoint version

Maths Inside project videos

Maths Inside project class activity handouts and teacher’s notes

Maths Inside project summary handout

**This module is**

The first in a series of 3 professional development workshops

Designed to take between 90 and 120 minutes

**Learning outcomes**

Teachers will gain an understanding of how Maths Inside resources can be introduced into classroom teaching.

Teachers will explore and understand the use of rich tasks and investigative learning approaches that use ICT in classrooms, particularly with reference to the real world applications of mathematics and ICT

**AITSL Standards addressed**

Standard 2: Know the content and how to teach it

2.1 Content and teaching strategies of the teaching area

2.5 Literacy and numeracy strategies

2.6 Information and Communication Technology (ICT)

## Standard 3: Plan for and implement effective teaching and learning

 3.3 Use teaching strategies

 3.4 Select and use resources

Standard 6: Identify and plan professional learning needs

###  6.2 Engage in professional learning and improve practice

###  6.3 Engage with colleagues and improve practice

###  6.4 Apply professional learning and improve student learning

# Background

This workshop is aimed at teachers wanting to introduce rich tasks and investigative pedagogies in their teaching of mathematics in secondary schools. The Maths Inside project is funded by the Commonwealth to increase engagement in mathematics learning in secondary schools. The main outputs of the project are the development of Case Studies on the contributions of CSIRO mathematical scientists, prepared by professional scientific communicators as videos and illustrated text, with accompanying classroom activities. Links to the Australian Curriculum: Mathematics are made explicit so that teachers can reveal the purpose of school mathematics. The project is producing authentic teaching and learning materials that are classroom ready, referenced to the Australian Curriculum (Years 8-12), and pedagogically sound.

# Resources

* Project videos and classroom activity sheets (student handouts)
* Teacher’s Notes relating to classroom activities
* All project materials can be accessed at:

<http://mathsinside.uts.edu.au>

or

<http://aamt.edu.au>

These details are also listed on slide 17 of the PowerPoint slides

Facilitators will require internet access (or have the videos and some sample class activities saved on a drive) in order to show the Case Study videos and examine classroom activities as examples, as well as facilities to project the resources.

# Slide 2

Explain nature of the project, links with CSIRO and AAMT.

* In 2014 UTS awarded $1.9m in funding over 3 years, under the Commonwealth Australian Maths and Science Partnerships Program (AMSPP), to research and develop learning resources. Feedback data will result in published research output.
* “Maths Inside” is developing resources to bring maths to life for high school students and address dwindling numbers of students taking advanced maths and science
* UTS cross-faculty team of Dr Mary Coupland in Science, Associate Professor Anne Prescott and Professor Sandy Schuck from Arts and Social Sciences are collaborating with CSIRO and AAMT to deliver this project. The team is being mentored by the former Chief Scientist and UTS Distinguished Professor Jim Peacock, AC FRS.
* Many students are opting out of higher levels of mathematics. Major reports have highlighted the importance of providing quality junior school experiences in maths, and raising awareness of career and personal relevance of mathematics. “Maths Inside” project is addressing both of these issues.

# Slide 3

Prompt participants to reflect, get in to small groups, and then share with the whole group what their experience has been of the topic being addressed.

Link reflections with aims of the project: the Maths Inside resources and approach are designed to provide a practical, curriculum-based experience which results in a possible answer to the questions *“What is the point of this maths? What are we going to use it for?”*

# Slide 4

Main outputs of the project are Case Study films on the contributions of CSIRO mathematical scientists, prepared by professional scientific communicators, with accompanying classroom activities designed by AAMT. Links to the Australian Curriculum: Mathematics will be explicit so that teachers can reveal the purpose of school mathematics. The project is producing authentic teaching and learning materials that are classroom ready, referenced to the Australian Curriculum (Years 8-12), and pedagogically sound. The videos and class activities are linked as topics but can be run separately.

# Slide 5

Workshops are being held around the country to promote the materials developed, and they will also be available on a web platform being developed by AAMT as a repository for this and other items for teacher professional learning. Existing networks in schools will be used to facilitate the work of the project, including the CSIRO Scientists and Mathematicians in Schools initiative.

# Slide 6

Resources can be use in year 7, but research data to be collected from years 8-12.

Summarise role of *Rich* learning tasks in project resources: emphasis on investigations and open-ended learning rather than drill exercises. As much as possible, activities have been designed to offer opportunities for creative thinking and for different levels of engagement within the same group of students. There are opportunities for cross-curricular links and STEM-based initiatives in particular.

# Slide 7

Prompt participants to follow instructions on the slide and report back to the whole group.

In small groups, teachers to reflect on their current and past experiences of teaching mathematics; what are the elements that make for a successful or unsuccessful lesson? Encourage honest reflection and open discussion among the whole group, without judgment on the teachers’ practice. The role of the project is to support the kind of resource development and planning that most teachers would want to engage in of they had the budget and time to do so.

# Slide 8-10

Move on to resources themselves; next 3 slides introduce some of the topics areas and scientists working on projects associated with Maths Inside. We have access to some of the authentic research data from these projects and have used them in designing class activities, so students would be using real project data in class.

# Slide 11

Access the project online resource area using the log- in information (set this up before the workshop so it can be accessed right away) and handout some sample Teacher’s Notes and Student Handouts. Show one of the videos linked to the selected handouts , suggesting participants view the video in conjunction with the handouts.

# Slide 12

Briefly indicate what the level of engagement has been so far, and summarise the feedback.

# Slide 13

Stuart Palmer (Maths Inside resource developer) facilitating the ASKAP Practical Parabolas (3B) he developed, in 2016.

# Slide 14

Year 10 students at Lindisfarne Grammar School, NSW participating in the ASKAP Practical Parabolas (3B) activity in October 2016.

# Slide 15

Prompt participants to return their focus to the sample classroom activities and video in order to explore in more detail how the resources can be used to support learning that engages student more deeply. Facilitator to take notes from teacher feedback; how would teachers use these activities in *their* classrooms?

# Slide 16

To find out more and get further involved in the project, contact the Project Manager to find out more.

# Summary

Facilitators should use the TEMPEST/Maths Inside evaluation survey available on the project online resource area and return completed forms to the Maths Inside Project Manager. This evaluation will assess to what extent the workshop has met its goals of:

* generating an understanding of the Maths Inside project
* reflecting on rich and investigative modes of mathematics learning
* encouraging teachers to develop their classroom delivery and understanding of the curriculum with reference to the real world applications of mathematics and ICT

# Further ideas

Facilitators could suggest reviewing more of the Maths Inside resources available on the online area linked in Resources section above, and contacting the project team to explore the possibility of collaborating further on the project (contact details for the Project Manager are on slide 18).

Facilitators could also suggest participants find out more about other AMSPP projects on the Dimensions site [http://dimensions.aamt.edu.au](http://dimensions.aamt.edu.au/).