ECH 431

Teaching and Learning Mathematics

S1 Day 2017

Institute of Early Childhood

Contents

Disclaimer

Macquarie University has taken all reasonable measures to ensure the information in this publication is accurate and up-to-date. However, the information may change or become out-dated as a result of change in University policies, procedures or rules. The University reserves the right to make changes to any information in this publication without notice. Users of this publication are advised to check the website version of this publication [or the relevant faculty or department] before acting on any information in this publication.

General Information

Unit convenor and teaching staff
Convenor
Susan Busatto
susan.busatto@mq.edu.au

Tutor
Kristy Campbell
kristy.campbell@mq.edu.au

Kelly Johnston
kelly.bittner@mq.edu.au

Credit points
3

Prerequisites
ECH335 or ECHE234 or admission to GDipAdvStEc

Corequisites

Co-badged status
The ECH431 (day) unit guide and the ECH431 (external) unit guides are the same

Unit description
This unit builds on the knowledge gained in previous units, further developing student's knowledge of the principles and practices of teaching and learning mathematics. Students explore a range of strategies for assessing children's mathematical understandings, and design and implement lesson sequences to enhance the growth of children's mathematical thinking. The integration of technology with mathematics and with other key learning areas, including differentiating curriculum to meet the diverse needs of learners, is also addressed.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

> Develop further understanding of the major theoretical and research directions and current issues in mathematics education.

Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.

Demonstrate knowledge of mathematical concepts and processes in the areas of data, measurement and working mathematically.

Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.

Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.

Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.

Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

General Assessment Information

Department of Educational Studies (EC) Assessment Presentation & Submission Guidelines

Please follow these guidelines when you submit each assignment:

- Allow a left and right-hand margin of at least 2cm in all assignments.
- Please type all assignments using 12-point font and 1.5 spacing.
- All assessments must be submitted through Turnitin in .doc or .pdf format for submission.
- It is the onus of the student to ensure that all assessments are successfully submitted through Turnitin.
- Faculty assignment cover sheets are <u>NOT</u> required for this unit.

Draft Submissions & Turnitin Originality Reports

- Students may use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.
- Students are strongly encouraged to upload a draft copy of each assessment to Turnitin at least one week prior to the due date to obtain an Originality Report.
- The Originality Report provides students with a similarity index that may indicate if plagiarism has occurred. Students will be able to make amendments to their drafts prior to their final submission on the due date.
- Generally, one Originality Report is generated every 24 hours up to the due date.

When preparing your assignments, it is essential that:

- Students must retain a copy of all assignments before submission, and retain the copy until your final grade for the subject has been received;

- Marks will be deducted if you submit your assessment late (refer to the 'late assessments' section below for more details);

- Unless there are exceptional circumstances, no assessment will be accepted after the date that the assessment has been returned to other students.

- If an assessment is considered to be below passing standard, another staff member on the unit will provide a second opinion. No failed assessment may be re-submitted.

Final Submissions

- Students are responsible for checking that their submission has been successful and has been submitted by the due date and time.

- Late submissions due to last minute technical difficulties will incur a lateness penalty.*

Assignment extensions and late penalties

Applications for extensions must be made via AskMQ at https://ask.mq.edu.au as a "Disruption to Studies" request before the submission date. Students who experience a disruption to their studies through ill-health or misadventure are able to apply for this request. Extensions can only be granted if they meet the Disruption to Studies policy and are submitted via ask.mq.edu.au. This will ensure consistency in the consideration of such requests is maintained.

In general, there should be no need for extensions except through illness or misadventure that would be categorised as unavoidable disruption according to the University definition of same, and currently available at:

http://students.mq.edu.au/student_admin/exams/disruption_to_studies/

Late submissions without extension will receive a penalty of 5% reduction of the total possible mark for each day late (including weekends and public holidays). You are reminded that submitting even just 1 day late could be the difference between passing and failing a unit. Late penalties are applied by unit convenors or their delegates after tasks are assessed.

No assessable work will be accepted after the return/release of marked work on the same topic. If a student is still permitted to submit on the basis of unavoidable disruption, an alternative topic may be set.

Students should keep an electronic file of all assessments. Claims regarding "lost" assessments cannot be made if the file cannot be produced. It is also advisable to keep an electronic file of all drafts and the final submission on a USB untouched/unopened after submission. This can be

used to demonstrate easily that the assessment has not been amended after the submission date.

- Please notify the unit coordinator of your intention to request an extension (via Dialogue in iLearn), however, an extension will only be granted on receipt of the completed form submitted through ask.mq.edu.au, plus documentation.
- Emails are not appropriate means of extension requests.
- It is essential that you plan ahead and organise your study time effectively. Poor time management is not grounds for an extension

Department of Educational Studies (EC) Academic Honesty Guidelines:

All assignments should cite and provide full bibliographical details of all material that you have used to inform or support your ideas. Early Childhood students are required to use the American Psychological Association (APA) referencing procedures. Full details about how to cite and reference correctly can be found in **Perrin (2015)** and in the **Academic Honesty Handbook**.

The following guide can be purchased from the Co-op Bookshop. This is a recommended text Perrin, R. (2015). Pocket guide to APA style (5th ed.). Wadsworth: Cengage Learning. Grades

Grades

Grades will be awarded at the completion of the unit according to the following criteria.

HD High Distinction 85-100%

Provides consistent evidence of deep and critical understanding in relation to the learning outcomes. There is substantial originality and insight in identifying, generating and communicating competing arguments, perspectives or problem solving approaches; critical evaluation of problems, their solutions and their implications; creativity in application as appropriate to the discipline.

D Distinction 75-84%

Provides evidence of integration and evaluation of critical ideas, principles and theories, distinctive insight and ability in applying relevant skills and concepts in relation to learning outcomes. There is demonstration of frequent originality in defining and analysing issues or problems and providing solutions; and the use of means of communication appropriate to the discipline and the audience.

Cr Credit 65-74%

Provides evidence of learning that goes beyond replication of content knowledge or skills relevant to the learning outcomes. There is demonstration of substantial understanding of fundamental concepts in the field of study and the ability to apply these concepts in a variety of contexts; convincing argumentation with appropriate coherent justification; communication of ideas fluently and clearly in terms of the conventions of the discipline.

P Pass 50-64%

Provides sufficient evidence of the achievement of learning outcomes. There is demonstration of understanding and application of fundamental concepts of the field of study; routine argumentation with acceptable justification; communication of information and ideas adequately in terms of the conventions of the discipline. The learning attainment is considered satisfactory or adequate or competent or capable in relation to the specified outcomes.

F Fail 0-49%

Does not provide evidence of attainment of learning outcomes. There is missing or partial or superficial or faulty understanding and application of the fundamental concepts in the field of study; missing, undeveloped, inappropriate or confusing argumentation; incomplete, confusing or lacking communication of ideas in ways that give little attention to the conventions of the discipline.

Assessment Tasks

Name	Weighting	Hurdle	Due
Weekly online tasks	30%	No	weekly
Misconceptions in mathematics	35%	No	Week 6 or at On Campus Day 2
Finding the M in STREAM	35%	No	In class in Week 13 or online

Weekly online tasks

Due: **weekly**
Weighting: **30%**

Each week students will respond to an online provocation, collating relevant research in response to the weekly concept. Here the goal is to link research and practice and provide evidence of effective mathematics teaching and learning strategies to cater for diverse learners. Students will first complete their own post and then contribute to the Professional Learning Network (PLN) by responding to another student or other students. Three tasks, selected at random from the weekly postings, will be marked over semester.

Additional details including marking criteria will be provided on iLearn.

On successful completion you will be able to:

• Develop further understanding of the major theoretical and research directions and current issues in mathematics education.

• Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.

- Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.
- Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Misconceptions in mathematics

Due: **Week 6 or at On Campus Day 2**
Weighting: **35%**

In this assessment students identify three misconceptions that impact on teaching and learning in mathematics within Birth to Five contexts or in School Settings. Students then develop a pamphlet of information (2 pages) for each of the misconceptions. Each pamphlet should address key research literature and present resources and activities to address the misconception. Students will present their ideas to peers (peer mark /5) in class (internals) or at the on campus day (externals).

Additional details including marking criteria will be provided on iLearn.

On successful completion you will be able to:

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Finding the M in STREAM

Due: **In class in Week 13 or online**
Weighting: **35%**

Within this assessment students work collaboratively to develop a teaching resource to support Mathematics Learning in STREAM (Science, Technology, Reading, Engineering and Mathematics). Here, students will identify an example of quality literature that presents opportunities for learning in STREAM and then develop learning activities to focus on developing skills in mathematics. Students will present their work to peers online (externals) and in class (internals). The group component of this work is marked out of 15 and the individual component

out of 20.

Additional details including marking criteria will be provided on iLearn.

On successful completion you will be able to:

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Demonstrate knowledge of mathematical concepts and processes in the areas of data, measurement and working mathematically.
- Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Delivery and Resources

Department of Educational Studies (EC) Relevant Documents

The information in this *Unit Guide* must be read in conjunction with the following documents available for download from iLearn:

- *Academic Honesty Handbook*
- *Unit Readings, Assessments*

Department of Educational Studies Electronic Communication

During semester time, staff may contact students using the following ways:

- *Dialogue* function on iLearn
- Official *MQ Student Email* Address

It is the student's responsibility to check all electronic communication on a regular weekly basis.

Department of Educational Studies (EC) Unit Expectations

- In order to be eligible for a passing grade, students must meet the following attendance requirements:
  - Internal Students: Participate in at least 80% of all tutorials – punctuality is expected. Consistent lateness or absence will jeopardise a passing grade
  - External Students: Participate in all on-campus sessions – punctuality is

expected.

- Students are required to contribute to all online and tutorials tasks
- Students are expected to read weekly readings before completing tasks and attending tutorials
- Students are expected to listen/attend weekly lectures before completing tasks and attending tutorials
- All assessment tasks must be submitted

Withdrawing from this UG Unit

If you are considering withdrawing from this unit, please seek academic advice by writing to iec@mq.edu.au before doing so as this unit may be a co-requisite or prerequisite for units in the following semesters and may impact on your progression through the degree.

Withdrawing from this PG Unit

If you are considering withdrawing from this unit, please seek academic advice by writing to pg.educ_iec@mq.edu.au before doing so as this unit may be a co-requisite or prerequisite for units in the following semesters and may impact on your progression through the degree.

ECH431 integrates in-class learning tasks (or external equivalent), online activities, independent and group work. Within ECH431 students are encouraged to contribute to the Professional Learning Network within the unit through online posts and sharing work with peers in class.

Classes

Students within ECH431 are required to attend classes as outlined by the unit schedule. It should be noted that classes are not conducted in all weeks of semester to enable preparation and engagement in group work. The timetable for internal classes can be found on the University web site at: https://timetables.mq.edu.au/2017/ .

External students will attend 2 compulsory on campus days on the 18th and 19th of April.

Resources

This unit requires students to access online journals and research materials through the Macquarie University Library website. There are no set texts for this unit. Weekly readings are available via iLearn.

Syllabus documents and support materials

Board of Studies NSW (2012). *Mathematics K-10 Syllabus).* Sydney: Board of Studies NSW

http://syllabus.bostes.nsw.edu.au/mathematics/mathematics-k10/guide-to-the-new-syllabus

Early Years Learning Framework

https://www.education.gov.au/early-years-learning-framework

Australian Curriculum Assessment and Reporting Authority [ACARA]. (2012). Australian Curriculum: Mathematics.

http://www.australiancurriculum.edu.au/Mathematics/Rationale

http://www.australiancurriculum.edu.au/mathematics/structure

Top Drawer Teachers site

http://topdrawer.aamt.edu.au/

Unit Schedule

Week Beginning	Weekly Topic	Tasks and Readings
Week 1 February 27	**Introductions and Professional learning Networks:**	**Class Activity:** NO internal classes. Online tasks for ALL students **Readings:** Early Years Learning Framework. (2014). Retrieved from http://docs.education.gov.au/node/2632 Board of Studies, New South Wales (n.d.) Guide to the new mathematics K-10 syllabus. Retrieved from http://syllabus.bos.nsw.edu.au/mathematics/mathematics-k10/guide-to-the-new-syllabus/ Perez, L. (2012). "Innovative professional development", *Knowledge Quest, 40*. 3, pp. 20-22. *(available through MultiSearch on the Macquarie Library website)*
Week 2 March 6	**Mathematics: Technology and mathematics.**	**Class Activity:** Internal Students: internal classes External Students: online tasks **Readings:** Skillen, M.(2014). Teaching with technology: Exploring mathematics in the real-world with skitch. *Australian Primary Mathematics Classroom*, *Vol. 19,* No. 2, pp. 33-37. *(available through MultiSearch on the Macquarie Library website)* Day, L. (2014). ICT: The changing landscape. *Australian Primary Mathematics Classroom*, *Vol. 19*, No. 2, pp. 23-27. *(available through MultiSearch on the Macquarie Library website)* OPTIONAL Reading Gadanidis, G. & Hughes, J. (2011). Performing big math ideas across the grades. *Teaching Children Mathematics,17*, 8, pp. 486-496 *(available through MultiSearch on the Macquarie Library website)*

Week 3 March 13	**Mathematics: exploring student misconceptions and Working with Diverse Learners (a)**	**Class Activity:** Internal Students: internal classes External Students: online tasks **Readings:** Treahy, D., Gurganus, S. (2010) Models for special needs students. *Teaching Children Mathematics, 16,* 8, pp. 484-490 *(available through MultiSearch on the Macquarie Library website)* Notari-Syverson, A. & Sadler, F. (2008). Math is for everyone: Strategies for supporting early mathematical competencies in young children. Young Exceptional Children 11: 2-16 *(available through MultiSearch on the Macquarie Library website)* OPTIONAL reading Clarke, D., Downton, A. Roche, A. (2011). The one-minute challenge. *Teaching Children Mathematics, 17,* 6, pp. 342-349 *(available through MultiSearch on the Macquarie Library website)*
Week 4 March 20	**Working with Diverse Learners (b)**	**Class Activity:** NO internal classes. Online tasks for ALL students **Readings:** Barger, R. (2009). Gifted, talented, and high achieving. *Teaching Children Mathematics, 16,* 3, pp. 154-161 *(available through MultiSearch on the Macquarie Library website)* Brown, N. Watson, J., Wright, S. & Skalicky, J. (2011). A primary classroom enquiry: Estimating the height of a tree. *Australian Primary Mathematics Classroom, 16,* 2. p. 3-11. *(available through MultiSearch on the Macquarie Library website)*
Week 5 March 27	**There is an App for that: the tablet revolution?**	**Class Activity:** NO internal classes. Online tasks for ALL students **Readings:** Larkin, K. (2014). iPad apps that promote mathematical knowledge?: Yes, they exist! [online]. *Australian Primary Mathematics Classroom, Vol. 19*, No. 2, pp.28-32. *(available through MultiSearch on the Macquarie Library website)* Highfield, K. & Goodwin, K. (2013). Apps for mathematics learning: A review of 'educational' apps from the iTunes 378 App Store. In V. Steinle, L. Ball & C. Bardini (Eds.), *Mathematics education: Yesterday, today and tomorrow.* (Proceedings of the 36th annual conference of the Mathematics Education Research Group of Australasia, pp. 378 - 385), Melbourne: MERGA Inc. (retrieved from http://www.merga.net.au/documents/Highfield_et_al_MERGA36-2013.pdf) OPTIONAL Reading Thach, K.& Norman, K. (2008). Technology-rich mathematics instruction. *Teaching Children Mathematics, 15,* 3, pp. 152-158 *(available through MultiSearch on the Macquarie Library website)*

Week 6 April 3	**Connected outcomes, STEM and STEAM**	**Class Activity:** – Assessment 2 presentations Internal students (to a small group) in class. Externals present at on campus day 2. **Readings:** Lyon, A. & Bragg, L. (2011). Food for thought: the mathematics of the kitchen garden. *Australian Primary Mathematics Classroom,* 16 (1) p. 25-32 *(available through MultiSearch on the Macquarie Library website)* Roehrig, G., Moore, T., Wang, H., & Park, M. (2012). Is adding the E enough? Investigating the impact of K-12 engineering standards on the implementation of STEM Integration. *School Science and Mathematics*, *112,* 1, p.31–44, DOI: 10.1111/j.1949-8594.2011.00112.x *(available through MultiSearch on the Macquarie Library website)* OPTIONAL Reading Bragg, L. (2014) Geocaching: Finding mathematics in a global treasure hunt [online]. *Australian Primary Mathematics Classroom, Vol. 19,* No. 4 pp.9-14. *(available through MultiSearch on the Macquarie Library website)*
Week 7 April 10	**Linking curriculum, mathematics across KLAs**	**Class Activity:** Internal Students: internal classes External Students: online tasks **Readings:** Marston, J., Muir, T. & Livy, S. (2013). Can we really count on Frank? Using a framework to select and evaluate picture books for mathematical concept development. *Teaching Children Mathematics* 19(7): 440-448. *(available through MultiSearch on the Macquarie Library website)* Hojnoski, R., Polignano, J., & Columba, H. L. (2015). Increasing teacher mathematical talk during shared book reading in the preschool classroom: A pilot study. *Early Education and Development*, Published online December 2015. P.1-16. *(available through MultiSearch on the Macquarie Library website)* OPTIONAL Reading Hurst, C. (2011) Engagement and connection in mathematical learning [online]. *Prime Number, 26,* 3, pp. 3-6. *(available through MultiSearch on the Macquarie Library website)*
MID SESSION BREAK (APRIL 17 – 28)		
Week 8 May 2		**Class Activity:** Internal Students: internal classes External Students: online tasks **Readings:** Howard, P. & Perry, B. (2011). Aboriginal children as powerful mathematicians. In N. Harrison (Ed) *Teaching and Learning In Aboriginal Education*. p.130-146. *(available through iLearn from week 5)* Papic, M. (2013). A mathematics intervention: The case of 4 year-old Rylan and Hilda!. *Procedia-Social and Behavioral Sciences*, *106*, 92-101. *(available through MultiSearch on the Macquarie Library website)* Optional Reading: Gear, A. (2012). A cultural introduction to math. *Teaching Children Mathematics, 18,* No. 6, pp. 354-360 *(available through MultiSearch on the Macquarie Library website)*

Week 9, 10, 11 (MAY 8 - 26) **ECHP421 Prac – no classes or online tasks in weeks 9, 10, 11**		
Week 12 May 29	**Extending Learning, Play and rich tasks**	**Class Activity:** NO internal classes. Online tasks for ALL students **Readings:** Sumpter, L., & Hedefalk, M. (2015). Preschool children's collective mathematical reasoning during free outdoor play. *The Journal of Mathematical Behavior*, *39*, 1-10. *(available through MultiSearch on the Macquarie Library website)* Cohrssen, C., Tayler, C., & Cloney, D. (2015). Playing with maths: implications for early childhood mathematics teaching from an implementation study in Melbourne, Australia. *Education 3-13*, *43* (6), 641-652. *(available through MultiSearch on the Macquarie Library website)*
Week 13 June 5	**Reflections and Implications**	**Class Activity:** – Assessment 3 presentations in class (externals present online). Internal students in class. Externals students present online

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.au/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment tasks

- Weekly online tasks
- Misconceptions in mathematics
- Finding the M in STREAM

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Learning outcome

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.

Assessment task

- Weekly online tasks

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Learning outcome

- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment tasks

- Weekly online tasks

- Misconceptions in mathematics
- Finding the M in STREAM

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Develop further understanding of the major theoretical and research directions and current issues in mathematics education.
- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Demonstrate knowledge of mathematical concepts and processes in the areas of data, measurement and working mathematically.
- Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment tasks

- Weekly online tasks
- Misconceptions in mathematics
- Finding the M in STREAM

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.

Assessment tasks

- Weekly online tasks
- Misconceptions in mathematics
- Finding the M in STREAM

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcomes

- Demonstrate research based knowledge of teaching and learning approaches to differentiating curriculum to meet the diverse needs of learners in the mathematics classroom.
- Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.
- Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.

Assessment tasks

- Weekly online tasks
- Misconceptions in mathematics
- Finding the M in STREAM

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Design lesson sequences that enhance the growth of children's mathematical thinking, reflect current issues in research and integrate other curriculum areas.
- Demonstrate knowledge of mathematical concepts and processes in the areas of data, measurement and working mathematically.
- Demonstrate a capacity to use appropriate software for student profiling and reporting, lesson preparation and general administrative tasks.
- Develop an awareness of the range of application and adaptive technologies available to support students with special needs.

Assessment tasks

- Weekly online tasks
- Misconceptions in mathematics
- Finding the M in STREAM

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Learning outcome

- Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.

Assessment tasks

- Weekly online tasks
- Finding the M in STREAM

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Learning outcome

- Demonstrate effective mathematics teaching and learning strategies for meeting the needs of indigenous students.

Assessment tasks

- Weekly online tasks
- Finding the M in STREAM