



# EDST3110

## Designing Mathematics, Science and Technology Learning

Session 1, In person-scheduled-infrequent, North Ryde 2023

*Macquarie School of Education*

### Contents

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<a href="#"><u>General Information</u></a>	2
<a href="#"><u>Learning Outcomes</u></a>	2
<a href="#"><u>General Assessment Information</u></a>	4
<a href="#"><u>Assessment Tasks</u></a>	6
<a href="#"><u>Delivery and Resources</u></a>	8
<a href="#"><u>Unit Schedule</u></a>	9
<a href="#"><u>Policies and Procedures</u></a>	10
<a href="#"><u>Changes from Previous Offering</u></a>	13
<a href="#"><u>5Rs Framework</u></a>	13
<a href="#"><u>Changes since First Published</u></a>	13

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#### **Disclaimer**

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## General Information

Unit convenor and teaching staff

Convenor and Lecturer

Anne Forbes

[anne.forbes@mq.edu.au](mailto:anne.forbes@mq.edu.au)

Contact via email

29WW, Room 240

By appointment

Convenor, Lecturer, Tutor

Laurinda Lomas

[laurinda.lomas@mq.edu.au](mailto:laurinda.lomas@mq.edu.au)

Contact via email

Room 272, 29 Wally's Walk

By appointment

Credit points

10

Prerequisites

120cp at 1000 level or above including (EDST2000 or EDST200) and (EDST2110 or EDST211)

Corequisites

Co-badged status

Unit description

This unit builds upon the previous unit (EDST2110) by developing pre-service primary teachers' capabilities in the design of effective learning programs in mathematics, and science and technologies (design and digital). Students will develop capabilities as designers of learning, utilising authentic inquiry-based contexts including sustainability perspectives.

## 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:

**ULO1:** Design learning experiences (mathematics and science and technology) using a

range of pedagogical approaches, including inquiry-based models

**ULO2:** Design and evaluate assessment strategies aligned with a range of curriculum and pedagogical approaches (mathematics and science and technology)

**ULO3:** Demonstrate competencies in planning for Working Mathematically, Scientifically and Technologically across a range of learning environments

**ULO4:** Develop program design skills to support the development of coherent learning progressions for all learners

**ULO5:** Demonstrate an ability to integrate sustainability into program design

## General Assessment Information

- Students should be aware of and apply the University policy on academic honesty (see: <https://policies.mq.edu.au/document/view.php?id=3>)
- Unless a Special Consideration (see: <https://students.mq.edu.au/study/assessment-exams/special-consideration>) request has been submitted and approved, (a) a penalty for lateness will apply – 5 marks out of 100 credit will be deducted per day (5%) for assignments submitted after the due date – and (b) no assignment will be accepted seven days (incl. weekends) after the original submission deadline.
- Late submission of time sensitive tasks (such as tests/exams, performance assessments/presentations, scheduled practical assessments/labs, etc.) will only be addressed by the unit convenor in a Special Consideration application. Special Consideration outcome may result in a new question or topic.
- Please format assessments using 12-point font and 1.5 spacing.
- All assessments are submitted electronically. Turnitin plagiarism detection software is used to check all written assessments.
- Students can use Turnitin's Originality Report as a learning tool to improve their academic writing if this option is made available in the unit.
- Students should carefully check that they submit the correct file for an assessment as no re-submissions will be accepted after the due date and time, including instances where students upload an incorrect file in error.
- Word limits are strictly applied. Work above the word limit will not be marked.
- All assessments use a clear marking scheme or rubric.
- Marking of all assessments is moderated by the Unit Convenor.
- Applications for extensions must be made via AskMQ (<https://ask.mq.edu.au/>).
- It is **not the responsibility** of unit staff to contact students who have failed to submit assessments. If you have any missing items of assessment, it is your responsibility to make contact with the unit convenor.
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**University policy on grading**

**Criteria for awarding grades for assessment tasks**

Assignments will be awarded grades ranging from HD to F according to guidelines set out in the University's Grading Policy. For Professional Experience units the PE Report is marked as satisfactory or unsatisfactory and the Teaching Performance Assessment (in final PE units) is marked as not meets, meets or exceeds. The following descriptive criteria are included for your information.

**Descriptive Criteria for awarding grades in the unit**

In order to meet the unit outcomes and successfully pass this unit, students must make a genuine attempt at all assessment tasks. Where any submitted assessment task is considered to be unsatisfactory in this regard, the highest possible final grade that can be awarded for the unit will be 45.

Grade	Descriptor
HD (High Distinction)	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)	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.

<b>Cr</b> (Credit)	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.
<b>P</b> (Pass).	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
<b>F</b> (Fail)	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.

Note: If you fail a unit with a professional experience component, the fail grade will be on your transcript irrespective of the timing of the placement.

**Withdrawing from this unit**

If you are considering withdrawing from this unit, please seek academic advice via <https://ask.mq.edu.au> before doing so as this unit may be a co-requisite or prerequisite for units in the following sessions and may impact on your course progression.

**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](https://ask.mq.edu.au).

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Science and technology resources</a>	35%	No	23:55 24/3/2023
<a href="#">Case study mathematics learning and teaching</a>	55%	No	23:55 4/6/2023
<a href="#">Tutorial participation</a>	10%	No	All weekly tutorials and OCDs

### Science and technology resources

Assessment Type <sup>1</sup>: Learning plan

Indicative Time on Task <sup>2</sup>: 24 hours

Due: **23:55 24/3/2023**

Weighting: **35%**

Plan, design and produce science and technology resources to assess learning.

On successful completion you will be able to:

- Design learning experiences (mathematics and science and technology) using a range of pedagogical approaches, including inquiry-based models
- Design and evaluate assessment strategies aligned with a range of curriculum and pedagogical approaches (mathematics and science and technology)
- Demonstrate competencies in planning for Working Mathematically, Scientifically and Technologically across a range of learning environments
- Develop program design skills to support the development of coherent learning progressions for all learners
- Demonstrate an ability to integrate sustainability into program design

## Case study mathematics learning and teaching

Assessment Type <sup>1</sup>: Case study/analysis

Indicative Time on Task <sup>2</sup>: 36 hours

Due: **23:55 4/6/2023**

Weighting: **55%**

Interview one primary school student. Interpret the data from the interview to write a brief summary (report) of what the student understands about mathematical concepts and skills, drawing links between the knowledge they demonstrate and the strategies they use.

Design a lesson for the student that you believe will develop their understanding and those of other students in their class. Justify your planning decisions by using the interview data and references to mathematics education literature.

On successful completion you will be able to:

- Design learning experiences (mathematics and science and technology) using a range of pedagogical approaches, including inquiry-based models
- Design and evaluate assessment strategies aligned with a range of curriculum and pedagogical approaches (mathematics and science and technology)
- Demonstrate competencies in planning for Working Mathematically, Scientifically and Technologically across a range of learning environments
- Develop program design skills to support the development of coherent learning

progressions for all learners

## Tutorial participation

Assessment Type <sup>1</sup>: Participatory task

Indicative Time on Task <sup>2</sup>: 0 hours

Due: **All weekly tutorials and OCDs**

Weighting: **10%**

Each tutorial will have a compulsory participation task students will complete in class.

On successful completion you will be able to:

- Demonstrate competencies in planning for Working Mathematically, Scientifically and Technologically across a range of learning environments
- Develop program design skills to support the development of coherent learning progressions for all learners

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Writing Centre](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources



### **Required and recommended texts**

Reys, R.E., Lindquist, M., Lambdin, D.V., Smith, N.L., Rogers, A., Cooke, A., Fanshawe, M. & Gronow, M. (2022). *Helping children learn mathematics* (4<sup>th</sup> Australian Edition). Wiley.

Skamp, K. & Preston, C. (Eds.) (2021). *Teaching primary science constructively* (7th ed.). Cengage.

### **Information about the unit iLearn site**

**This unit has a full web presence through iLearn.**

**Students will need regular access to a computer and the Internet to complete this unit.**

Weekly access to iLearn is compulsory for all students. Important assessment information will be posted here, as will other relevant unit notices and materials, including a reading template and guide to lecture note taking to assist your studies.

Various activities and materials for discussion and critical reflection are included and external students especially are encouraged to use this web component. Electronic links and suggested references will be included in the Leganto section, which is linked to the library. Please check the iLearn unit regularly.

Weekly lectures are available on the web through the ECHO360 lecture component. You must listen to all lectures.

PowerPoint slides are available in iLearn.

### **Access and technical assistance**

Information for students about access to the online component of this unit is available at <https://ilearn.mq.edu.au/login/index.php>. You will need to enter your student username and password.

Please do **NOT** contact the Unit Convenor regarding *iLearn* technical help.

Assistance is available from IT Helpdesk

Ph: 9850 4357 or 1800 67 4357

Email: [help.mq.edu.au](mailto:help.mq.edu.au).

On Campus: Ground floor at 18 Wally's Walk.

### **Structure**

The unit structure can be found in the university timetable <https://timetables.mq.edu.au/2023/>. In the tutorial students will discuss issues and questions arising from the lectures and prescribed readings. They are expected to base their arguments/discussions on evidence from published research and other relevant material. There will be a supporting iLearn site for the unit providing additional readings, links and materials.

#### **Frequent attendance**

The unit comprises a 1 x 1 hour lecture plus a 1 x 2 hour tutorial per week for 10 weeks. In the tutorial students will discuss issues and questions arising from the lectures and prescribed readings and undertake a variety of hands-on activities. Prescribed readings are listed on iLearn as part of the schedule. Lectures will be available through iLearn from the following website link: <http://ilearn.mq.edu.au>

#### **Infrequent attendance**

Infrequent mode lectures are the same as for frequent mode. Tutorials will be scheduled in 'blocks' during 2 on campus days (OCD) as follows:

- OCD#1 = Science and Technology. 5 hours on Saturday, 11/03/2023 from 9:00am - 2:00pm.
- OCD#2 = Mathematics. 7 hours on Saturday 22/04/2023 from 9:00am - 4:00pm.

**The weekly program for the course with the accompanying readings/ preparation is available on the iLearn unit site.**

## Unit Schedule

Please see iLearn for details

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Assessment Procedure](#)
- [Complaints Resolution Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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](http://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

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

## The Writing Centre

The [Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)
- [Student Advocacy](#) provides independent advice on MQ policies, procedures, and processes

## Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](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.

## **School of Education Procedures**

In addition, the following policies and procedures of the School of Education are applicable in this unit.

### **Attendance for undergraduate units**

All Internal tutorials begin in Week 1 of Session ie.e in the week beginning MONDAY 20 FEBRUARY 2023.

Activities completed during weekly tutorials (internal) or on campus days (external) are essential for building the core knowledge and/or skills required to demonstrate the learning outcomes of this unit [and to meet the AITSL Graduate Teacher Standards and/or ACECQA requirements]. Attendance at all tutorials or on campus days is expected and the roll will be taken. Make up tasks may be given if attendance is missed to ensure all content is covered to meet accreditation requirements.

Students are required to attend the tutorial in which they are enrolled. Any changes to tutorial enrolments must be completed officially through e-student. **Please do not contact the unit convenor requesting a change.**

### **Unit Expectations**

- Students are expected to read weekly readings before completing tasks and attending tutorials
- Students are expected to listen to/attend weekly lectures before completing tasks and attending tutorials

Note: It is not the responsibility of unit staff to contact students who have failed to submit assignments. If you have any missing items of assessment, it is your responsibility to make contact with the unit convenor.

### **Electronic Communication**

It is the student's responsibility to check all electronic communication on a regular weekly basis. Communication may occur via:

- Official *MQ Student Email Address*
- The *Dialogue* function on iLearn
- Other iLearn communication functions

### **External Students**

- The on-campus sessions on Saturday 11 March 2023 (11/03/2023) and Saturday 22 April 2023 (22/04/2023) are essential to student engagement and learning and attendance on all days is expected. Failure to attend or to have an approved Special Consideration may result in a Fail grade for the unit. Please see attendance requirements in this unit guide.
- Prior to the on-campus sessions, you should have read the prescribed readings and listened to the lectures. Summarise the main points and make a note of the key terms and definitions. Prepare any discussion questions of your own that you wish to share.

- Please make effective use of the online component of the unit and access iLearn regularly. Keep up to date with listening to the lectures on a weekly basis.

## Changes from Previous Offering

Tutorial participation marks are now part of the assessment scheme.

## 5Rs Framework

### 5Rs Framework

The 5Rs Framework, developed by the School of Education at Macquarie University, is embedded throughout your teacher education course.

Your use of the 5Rs Framework will help you develop the capabilities that will make your teaching career sustainable and fulfilling.

In this unit, you will learn using the 5Rs framework in the following important ways:

- Doing research to build up your professional knowledge
- Reflecting on the research to make informed decisions about student learning.

## Changes since First Published

Date	Description
05/03/2023	Due date of maths case study needed to be changed from 2.6.23 to 4.6.23
15/02/2023	Dates that needed to be changed missed in External Students section