# EDUC219

## Opening Real Science: Specialisation in Primary Science and Mathematics

S2 Online 2017

*Department of Educational Studies*

## Contents

# General Information

Unit convenor and teaching staff
Co-Convenor
Joanne Mulligan
joanne.mulligan@mq.edu.au

Lecturer
Susan Busatto
susan.busatto@mq.edu.au

Co-convenor
Michael Cavanagh
michael.cavanagh@mq.edu.au

Tutor
Mandy Yeates
mandy.yeates@mq.edu.au

Credit points
3

Prerequisites
12cp at 100 level or above

Corequisites

Co-badged status

Unit description
This unit promotes students' mathematical and scientific competencies within STEM education. Students select to study either the mathematics or science option. The mathematics option incorporates three online modules in mathematics education (Gateway to Numeracy, Smart Budgeting and Statistical Literacy). The science option incorporates three online modules in science education (Discovering Real Science through Big History, Frontiers of Real Science and Clocks in Rocks - focused on geological history). These modules have been purposefully designed to connect key themes in the historical development of scientific thinking and the future of cutting-edge scientific research, and to promote students' understanding of key aspects of numeracy for effective participation in modern society. The modules designed for this unit were developed under the Opening Real Science (ORS) project. This unit is relevant for students interested in developing STEM competencies and is recommended for teacher education students enrolled in early childhood or primary programs and other interested students. This unit is compulsory for students enrolled in specialisations in primary mathematics or science pre-service teacher education.

## 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:

Build knowledge and understanding of foundation scientific or mathematical concepts

Demonstrate an awareness of the scientific method and modern applications of science or mathematics

Develop an understanding of theories of inquiry based learning in mathematics or science education

Identify the ways that science or mathematics is used for effective participation in society

Develop communication skills, and learn how to construct a scientific or mathematical argument supported by evidence.

# General Assessment Information

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: https://students.mq.edu.au/study/my-study-program/special-consideration/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.

**Disruption to Studies**

The following link takes you to the Disruption to Studies policy, which makes clear the ways in which you can apply for special consideration in times of difficulty. http://students.mq.edu.au/student_admin/exams/disruption_to_studies/

# Assessment Tasks

| Name | Weighting | Hurdle | Due |
|---|---|---|---|
| Three blogs | 15% | No | Sept 8, Sept 15, Oct 6 (5pm) |
| Investigative Report | 45% | No | 30 October (5 pm) |
| Final Examination | 40% | No | Exam period |

## Three blogs

Due: **Sept 8, Sept 15, Oct 6 (5pm)**
Weighting: **15%**

Three x 200 word blogs for Science OR Mathematics streams must be submitted by students via iLearn.

For each blog students will provide a reflective account, respond to a scenario, or answer questions by referring to Topic learning activities.

Additional details including marking criteria will be provided in the Unit Outline which is available on iLearn

On successful completion you will be able to:

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society

## Investigative Report

Due: **30 October (5 pm)**
Weighting: **45%**

One x 1500 word investigative report on either the mathematics or science research question (depending on your selected stream, Mathematics or Science)

INVESTIGATIVE REPORT MATHEMATICS:—STATISTICAL REASONING

Explore this investigative question that can be answered by your own investigation where you access and analyse some data. *"What is the expected population growth of Sydney in the next decade?*

INVESTIGATIVE REPORT SCIENCE: —SCIENTIFIC REASONING

Explore the investigative question where you access and analyse some data. *"How do scientists know how old humans are?*

Additional details including the guidelines for report sections and a rubric showing marking criteria will be provided in the Unit Outline on iLearn.

On successful completion you will be able to:

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society
- Develop communication skills, and learn how to construct a scientific or mathematical argument supported by evidence.

## Final Examination

Due: **Exam period**
Weighting: **40%**

A 1.5 hour written exam comprising short answer questions covering the content of the unit

during the examination period.

On successful completion you will be able to:

- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Identify the ways that science or mathematics is used for effective participation in society

# Delivery and Resources

EDUC219 will be delivered fully on-line

# 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 outcome

- Build knowledge and understanding of foundation scientific or mathematical concepts

### Assessment task

- Three blogs

## 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 outcomes

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education

### Assessment tasks

- Three blogs
- Final Examination

## 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 outcomes

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics

### Assessment task

- Three blogs

## 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

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society
- Develop communication skills, and learn how to construct a scientific or mathematical argument supported by evidence.

## Assessment tasks

- Three blogs
- Investigative Report
- Final Examination

# 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

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society
- Develop communication skills, and learn how to construct a scientific or mathematical argument supported by evidence.

## Assessment tasks

- Three blogs
- Investigative Report
- Final Examination

# 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

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Demonstrate an awareness of the scientific method and modern applications of science or mathematics
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society
- Develop communication skills, and learn how to construct a scientific or mathematical argument supported by evidence.

## Assessment tasks

- Three blogs
- Investigative Report
- Final Examination

# 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 outcome

- Build knowledge and understanding of foundation scientific or mathematical concepts

## Assessment tasks

- Three blogs
- Final Examination

## 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 outcomes

- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society

### Assessment task

- Investigative Report

## 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 outcomes

- Build knowledge and understanding of foundation scientific or mathematical concepts
- Develop an understanding of theories of inquiry based learning in mathematics or science education
- Identify the ways that science or mathematics is used for effective participation in society

### Assessment task

- Investigative Report

# Changes from Previous Offering

This is the first time EDUC219 has been offered so there are no changes.

# Changes since First Published

| Date | Description |
| --- | --- |
| 04/08/2017 | The initial, formative Assessment Task 1 due date (3 x 200 word blogs) has been scaffolded so that each blog is submitted, one per week due Sept 8, 15, and October 6. These are completed well ahead of the main Assessment Task 2 (Investigative report) which is due on October 30. This schedule allows for the assessors (markers) to review and return feedback (grade) for the first two blogs before the third blog is due. Assessment Task 2 research questions (Mathematics - statistical reasoning, and Science - scientific reasoning) have been added to the assessment description |