



ECH 335

Young Children's Mathematics, Science and Technology 2

S1 External 2016

Institute of Early Childhood

Contents

<u>General Information</u>	2
<u>Learning Outcomes</u>	2
<u>Assessment Tasks</u>	3
<u>Delivery and Resources</u>	5
<u>Unit Schedule</u>	6
<u>Policies and Procedures</u>	7
<u>Graduate Capabilities</u>	8

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

Sandy Nicoll

sandy.nicoll@mq.edu.au

Leisa Kuehn

leisa.kuehn@mq.edu.au

Credit points

3

Prerequisites

39cp including (ECH232 or ECH215)

Corequisites

Co-badged status

Unit description

This unit builds on the knowledge gained in ECH232, exploring further the theory and practice of mathematics, science and technology for young children and children in K–6 classrooms. Students continue to gain an understanding of developmental stages in children's learning of mathematics and science. Teaching and assessment strategies relevant for planning and implementing developmental programs are examined including the integration of information and communication technologies.

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:

Continue to develop an understanding of the major theoretical developments in early childhood mathematics, science and technology education.

Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.

Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other

curriculum requirements of the Education Act.

Demonstrate knowledge of mathematical concepts and processes in the area of patterns & algebra and space & geometry.

Demonstrate knowledge of scientific concepts and processes related to the natural environment in the contexts of living things.

Develop an ethical stance on environmental education and assume responsibility for influencing the direction of early childhood practice in order to ensure sustainability for the future.

Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.

Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Assessment Tasks

Name	Weighting	Due
<u>Weekly Quizzes and online task</u>	30%	weekly
<u>Planning for Science Learning</u>	35%	April 15 OR June 9
<u>Maths across the curriculum</u>	35%	April 15 OR June 9

Weekly Quizzes and online task

Due: **weekly**

Weighting: **30%**

Each week students complete an online quiz (of up to 5 questions) in response to the learning module. Over semester a random selection of 6 quizzes are marked and included in the grade for this task.

Further details and criteria for this assessment are available on iLearn.

On successful completion you will be able to:

- Continue to develop an understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Demonstrate knowledge of mathematical concepts and processes in the area of patterns & algebra and space & geometry.
- Demonstrate knowledge of scientific concepts and processes related to the natural environment in the contexts of living things.

- Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.
- Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Planning for Science Learning

Due: **April 15 OR June 9**

Weighting: **35%**

This assessment requires the student to develop a mini unit of work for science learning using interactive technologies such as SMART notebook or PROwise software. This task can only be submitted after students have completed the first ICT topic and the Science module - so due date varies depending on the students schedule of modules.

Further details and criteria for this assessment are available on iLearn.

On successful completion you will be able to:

- Continue to develop an understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Demonstrate knowledge of scientific concepts and processes related to the natural environment in the contexts of living things.
- Develop an ethical stance on environmental education and assume responsibility for influencing the direction of early childhood practice in order to ensure sustainability for the future.
- Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.
- Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Maths across the curriculum

Due: **April 15 OR June 9**

Weighting: **35%**

This assessment requires students to select a children's book with potential to enhance mathematics learning in stage 2 or 3. Students then develop a mini-unit of work (presented as a booklet) of mathematics lessons. This task can only be completed after students have completed the mathematics modules -so due date varies depending on the students schedule of modules.

Further details and criteria for this assessment are available on iLearn.

On successful completion you will be able to:

- Continue to develop an understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Demonstrate knowledge of mathematical concepts and processes in the area of patterns & algebra and space & geometry.
- Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.

Delivery and Resources

ECH335 integrates in-class learning tasks (or external equivalent), online activities, and independent work. Within ECH335 students complete a series of three modules in Mathematics, Science and Technology. At the end of their modules (in the final week of semester) students share their work with peers in class or online.

Classes

Students within ECH335 required to attend classes as outlined by the unit schedule on iLearn. It should be noted that classes rotate through modules and so careful attention should be paid to the module schedule. Completion of all modules (internal classes or external equivalent) and online tasks is needed to successfully pass this unit. The timetable for internal classes can be found on the University web site at: <https://timetables.mq.edu.au/2016/> .

External students will attend 2 compulsory on campus days on the 3rd and 21st 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.

Unit Schedule

Week Beginning	External Students		
	Tutorial Group A (Thursday 1pm starting in X5B041)	Tutorial Group B (Thursday 1pm starting in X5B045)	Tutorial Group C (Thursday 1pm starting in X5B251)
	Tutorial Group D (Thursday 3pm starting in X5B041)	Tutorial Group E (Thursday 3pm starting in X5B045)	Tutorial Group F (Thursday 3pm starting in X5B251)
Week 1 <i>February 29th</i>	Maths Topic 1	Science Topic 1	ICT Topic 1
Week 2 <i>March 7th</i>	Maths Topic 2	Science Topic 2	ICT Topic 2
Week 3 <i>March 14th</i>	Maths Topic 3	Science Topic 3	ICT Topic 3
Week 4 <i>March 21st</i>	ICT Topic 1	Maths Topic 1	Science Topic 1
Week 5 <i>March 28th</i>	ICT Topic 2	Maths Topic 2	Science Topic 2
Compulsory external on campus day 1 Sunday 3rd April			
Week 6 <i>April 4th</i>	ICT Topic 3	Maths Topic 3	Science Topic 3
Mid Semester Break			
<u>Assessment 2 due 15th April</u> (External Students & Group A, B, D and E will submit the Mathematics Assessment. Groups C and F will submit the Science Assessment)			
Compulsory external on campus day 2 Thursday 21st April			
Week 7 <i>April 25th</i>	Science Topic 1	ICT Topic 1	Maths Topic 1

Week 8 <i>May 2nd</i>	Science Topic 2	ICT Topic 2	Maths Topic 2
Week 9 <i>May 9th</i>	Science Topic 3	ICT Topic 3	Maths Topic 3
Week 10 <i>May 16th</i>	ECHP323 Prac – no classes		
Week 11 <i>May 23rd</i>			
Week 12 <i>May 30th</i>			
<u>Assessment 3 due 9th June</u> (External Students & Group A, B, D and E will submit the Science Assessment. Groups C and F will submit the Mathematics Assessment)			
Week 13 <i>June 6th</i>	In class presentations – sharing either the science resource OR the mathematics booklet with peers in small groups.		

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

New Assessment Policy in effect from Session 2 2016 http://mq.edu.au/policy/docs/assessment/policy_2016.html. For more information visit http://students.mq.edu.au/events/2016/07/19/new_assessment_policy_in_place_from_session_2/

Assessment Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/assessment/policy.html>

Grading Policy prior to Session 2 2016 <http://mq.edu.au/policy/docs/grading/policy.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 http://www.mq.edu.au/policy/docs/disruption_studies/policy.html *The Disruption to Studies Policy is effective from March 3 2014 and replaces the Special Consideration Policy.*

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

- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning
- Maths across the curriculum

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 skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning

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

- Continue to develop an understanding of the major theoretical developments in early childhood mathematics, science and technology education.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Demonstrate knowledge of mathematical concepts and processes in the area of patterns & algebra and space & geometry.
- Demonstrate knowledge of scientific concepts and processes related to the natural environment in the contexts of living things.
- Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning
- Maths across the curriculum

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

- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.

- Continue to develop skills in designing, implementing and evaluating lesson sequences using knowledge of the NSW Curriculum Framework, NSW syllabuses and other curriculum requirements of the Education Act.
- Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning
- Maths across the curriculum

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

- Develop an ethical stance on environmental education and assume responsibility for influencing the direction of early childhood practice in order to ensure sustainability for the future.
- Demonstrate research-based knowledge of the models of pedagogy for teaching and assessing mathematics and science & technology.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning
- Maths across the curriculum

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

- Demonstrate knowledge of mathematical concepts and processes in the area of patterns & algebra and space & geometry.
- Develop skills in integrating information and communication technologies (ICT) within effective teaching and learning strategies to expand opportunities for students in mathematics and science learning.

Assessment tasks

- Weekly Quizzes and online task
- Planning for Science Learning
- Maths across the curriculum

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

- Develop an ethical stance on environmental education and assume responsibility for influencing the direction of early childhood practice in order to ensure sustainability for the future.

Assessment task

- Planning for Science Learning

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

- Develop an ethical stance on environmental education and assume responsibility for influencing the direction of early childhood practice in order to ensure sustainability for

the future.

Assessment task

- Planning for Science Learning