



EDUC109

Science: Today and Tomorrow

S2 Day 2018

Department of Educational Studies

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General Information

Unit convenor and teaching staff

Coordinator

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Lab Technician

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Credit points

3

Prerequisites

Corequisites

Co-badged status

Unit description

This unit provides students with opportunities to challenge their views about the nature of Science, to engage with Science in its many facets and to communicate ideas about Science. Students are exposed to Science enthusiasts and are encouraged to actively participate in hands-on practical work both inside and beyond the Science laboratory. Learning and assessment strategies are designed to maximise student involvement and to build capacity in more collaborative approaches to increasing science understandings. The unit supports students to make the transition from passive to active learners and to take a more self-directed role in communicating Science to a range of learners.

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:

1. demonstrate understanding of basic science concepts across the four sciences
2. reflect on your own science knowledge and understanding and how this was acquired
3. perform required laboratory tasks and conduct practical work
4. gather, process and present scientific information to solve problems
5. analyse and prepare science reports

6. demonstrate your understanding of content covered in lectures and tutorials

General Assessment Information

General instructions for Assignments:

- Students alone are responsible for assignment submission. Students are advised to keep an electronic copy/photocopy of all assignment.
- Use a word processor for your assignment. If access to word processing is a problem please seek assistance from Student IT Services http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.
- Use headings to separate clearly the various sections of the assignment. Make sure you cover all the sections that are defined in the assignment description and clearly listed on the assessment feedback sheet included with the assignment cover sheet.
- Submit your assignment electronically through Turnitin on the unit iLearn site
- Make sure you keep a copy of your assignment in case of loss.

Late submissions will be assessed as follows:

- Late with prior approval from ask.mq: normal marking if revised deadline is met.
- Late without prior approval or after revised deadline: a penalty of 5% of the total assignment mark per day overdue.

Extensions to assignment submission dates will only be granted in the case of documented 'unavoidable disruption'. This should preferably be submitted well before the due date. A penalty of 5% of the total assignment mark per day late will be applied for unapproved late submission.

Special Considerations

The Special Consideration provision is to support students who have been impacted by circumstances that are unexpected, unavoidable, significantly disruptive and beyond the student's control, and which may affect their performance in assessment.

The University classifies a circumstance as serious and unavoidable if it:

- could not have reasonably been anticipated, avoided or guarded against by the student; and
- was beyond the student's control; and
- caused substantial disruption to the student's capacity for effective study and/or completion of required work; and
- occurred during an event critical study period and was at least three (3) consecutive

days duration, and/or

- prevented completion of an assessment task scheduled for a specific date (e.g. final examination, in class test/quiz, in class presentation).

The following link takes you to the Special Considerations policy, which makes clear the ways in which you can apply for special consideration in times of difficulty.

<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>

Assessment Tasks

Name	Weighting	Hurdle	Due
Perception of Science	10%	No	3 Sep 2018
Communicating Science	40%	No	5 Oct 2018
Examination	40%	No	Examination Period
Engagement	10%	No	all weeks

Perception of Science

Due: **3 Sep 2018**

Weighting: **10%**

The purpose of this assignment is to gather information from your family/friends about their understanding/image of science and scientists and to reflect on these representations.

On successful completion you will be able to:

- 2. reflect on your own science knowledge and understanding and how this was acquired
- 5. analyse and prepare science reports

Communicating Science

Due: **5 Oct 2018**

Weighting: **40%**

The purpose of this assignment is two-fold: first, to produce a field report assessing human impact on the natural environment at Macquarie University (Part A) and second, the use the findings from Part A along with recent related media reports to write a media article about the environment at Macquarie University of relevance to the local community (Part B).

On successful completion you will be able to:

- 3. perform required laboratory tasks and conduct practical work

- 4. gather, process and present scientific information to solve problems
- 5. analyse and prepare science reports

Examination

Due: **Examination Period**

Weighting: **40%**

The examination questions will be drawn from the entire unit. Students are expected to demonstrate mastery of the content of the unit including material covered in the lectures and Lab sessions. It is essential that you have a strong understanding of the key science concepts in each of the major themes covered in this unit.

On successful completion you will be able to:

- 1. demonstrate understanding of basic science concepts across the four sciences
- 6. demonstrate your understanding of content covered in lectures and tutorials

Engagement

Due: **all weeks**

Weighting: **10%**

Consistently contributes to group activities and discussion including online environments; consistently responds very thoughtfully to other students' comments.

On successful completion you will be able to:

- 1. demonstrate understanding of basic science concepts across the four sciences
- 2. reflect on your own science knowledge and understanding and how this was acquired
- 3. perform required laboratory tasks and conduct practical work
- 4. gather, process and present scientific information to solve problems
- 5. analyse and prepare science reports
- 6. demonstrate your understanding of content covered in lectures and tutorials

Delivery and Resources

1. About this unit

Welcome to EDUC109 we are looking forward to sharing our enjoyment of science with you this semester. Science: Today and Tomorrow (EDUC109) is a 3-credit point designated planet unit of one semester duration. It has been developed as a science based unit to assist beginning teachers with science teaching both at primary and high school levels and, for those undergraduate students who are not directly involved with teaching but nevertheless are interested in science.

The unit addresses a range of science topics and their associated basic concepts drawn from the four major science disciplines – biology, earth and environmental science, chemistry and

physics. There will be opportunities for engagement with practical work and the use of ICT to facilitate your knowledge and understanding of science. The unit will cover some of the fascinating ideas and processes of science, developed over thousands of years of human endeavour or in a moment of genius. We hope you enjoy your studies.

2. Classes

All tutorials will be held in E7B 317 – Science Teacher Education laboratory.

You are required to wear covered shoes in the laboratory – open toed shoes, eating and drinking are unsafe in the lab and are therefore not permitted.

You are required to read all lecture notes and PowerPoint presentations as these contain the science content covered in this unit. These are available on-line in the unit iLearn <https://ilearn.mq.edu.au/login/MQ/>

The unit is supported by iLearn and by Echo360. PowerPoint slides; lecture notes and tutorial notes will be posted on iLearn as they become available. Please check regularly. We will also make regular use of laptop computers in the workshops.

The iLearn web page for this unit can be found at: <https://ilearn.mq.edu.au/login/MQ/>

Students will need to use their own student username and password to log in and then choose EDUC109 from their My Online Units menu. Contact the Macquarie University Library Student IT Help Desk (Phone: 9850 4357; Email: support@mq.edu.au) for assistance with difficulties or problems with iLearn.

In order to pass EDUC109, you are required to do the following:

- Engage with lectures and read web-based and printed materials for each module
- Participate actively in working groups
- Complete all assignments
- Attend the final examination

3. Note for attendance

Students are expected to attend lab sessions (tutorials), during which an attendance roll will be taken. Where a student has difficulty meeting attendance requirements, they must be prepared to substantiate their reasons by supplying relevant documentation to the unit convenor. Since participation in lab sessions is linked to achievement of unit learning outcomes, failure to substantiate absence may result in an FA final grade. Please note that for illness/misadventure "special consideration" should be applied (<https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration>).

Prescribed texts

American Association for the Advancement of Science. (2001). *Atlas of science literacy / Project 2061*. Washington DC: AAAS. Available as an online reference at <http://strandmaps.nsdl.org>

This is an invaluable resource for science communication. It maps the development of common science concepts from Kindergarten to Year 12 and helps you to locate and track

understandings of science concepts from simple to complex.

Skamp, K. (Ed.) (2012). *Teaching primary science constructively* (4th ed.). Melbourne: Thomson. Primary teacher education students may choose to purchase this text that will support their work in science and technology throughout their degree and beyond. Copies of this text are available on-line through the library and in the closed reserve section of the library.

Sydney Morning Herald. Daily Newspaper. For regular science-based articles.

Background readings in science

Ackerman, D. (2014). *The human age*. New York: WWNorton & Company.

Bryson, B. (2004). *A short history of nearly everything*. London: Black Swan.

Carson, R. (1962). *Silent spring*. Boston Mariner Books.

Cox, B. (2010). *Wonders of the solar system*. London: HarperCollins Publishers.

Darwin, C. (1859). *The origin of species*. London: Penguin.

Dennett, D. (1995). *Darwin's dangerous idea: Evolution and the meanings of life*. London: Penguin.

Hawking, S. (2008). *A brief history of time*. Chatham: Bantam Press.

Horsfall, M. (2008). *Creating your eco-friendly garden*. Collingwood: CSIRO Publishing.

Sagan, C. (1995). *The Demon-Haunted World: Science as a Candle in the Dark*. New York: Random House.

Background readings in science for schools

Australian Academy of Science. (2012). *Primary Connections: Linking science with literacy*. Canberra: Australian Academy of Science. Ensure that you refer to the updates *Primary Connections* texts, written for the Australian curriculum

Many titles available from www.science.org.au/primaryconnections

Board of Studies Teaching and Educational Standards. All NSW science syllabus documents are available from <http://www.boardofstudies.nsw.edu.au/>

Devereux, J. (2007). *Science in the primary and early years*. London: Sage/Open University Press.

Gillespie, H. (2007). *Science for primary school teachers*. Maidenhead: McGraw Hill/Open University Press.

Gregson, R. (Ed.). (2012). *Connecting with science education*. South Melbourne: Oxford University Press.

Harlen, W. & Aualter, A. (2004). *The teaching science in primary schools*. London: David Fulton.

Howitt, C. & Blake, E. (2010). *Planting the seeds of science*. Perth, W.A.: Curtin University.

Kalantzis, M., & Cope, B. (2008). *New learning: Elements of a science of education*. Melbourne: Cambridge University Press.

Rosebery, A. & Warren, B. (Eds.) (2008). *Teaching Science to English Language Learners*. Ohio: NSTA.

Tytler, R. (2007). Re-imaging science education, Australian Education Review, Australian Council of Educational Research. *Australian Education Review*, 51. Melbourne: ACER. Retrieved December 2, 2013, from http://www.acer.edu.au/research_reports/AER.ht

Venville, G., & Dawson, V. (Eds.) (2004). *The art of science teaching*. Crows Nest: Allen & Unwin.

Unit Schedule

Weeks 1 and 2: Professional Experiences

Week 3: Introduction and the nature of science

Week 4: Biology: The importance of plants, Ecology

Week 5: Genetics: Mendel to DNA

Week 6: Fieldwork, Environmental Sustainability

Week 7: Our changing earth

Mid-semester break

Week 8: Kitchen Chemistry

Week 9: Chemical reactions

Week 10: Force and motion

Week 11: Electricity and Magnetism

Week 12: Big bang, space and the evolution of the universe

Week 13: Summary

Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central\)](https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

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

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/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

- 2. reflect on your own science knowledge and understanding and how this was acquired
- 3. perform required laboratory tasks and conduct practical work
- 4. gather, process and present scientific information to solve problems

Assessment tasks

- Perception of Science
- Communicating Science
- Engagement

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

- 1. demonstrate understanding of basic science concepts across the four sciences
- 3. perform required laboratory tasks and conduct practical work

- 4. gather, process and present scientific information to solve problems
- 5. analyse and prepare science reports
- 6. demonstrate your understanding of content covered in lectures and tutorials

Assessment tasks

- Communicating Science
- Examination
- Engagement

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

- 2. reflect on your own science knowledge and understanding and how this was acquired
- 3. perform required laboratory tasks and conduct practical work
- 4. gather, process and present scientific information to solve problems
- 5. analyse and prepare science reports

Assessment tasks

- Perception of Science
- Communicating Science
- Examination
- Engagement

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

- 3. perform required laboratory tasks and conduct practical work
- 4. gather, process and present scientific information to solve problems

- 5. analyse and prepare science reports

Assessment task

- Communicating Science

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

- 4. gather, process and present scientific information to solve problems
- 5. analyse and prepare science reports
- 6. demonstrate your understanding of content covered in lectures and tutorials

Assessment tasks

- Perception of Science
- Communicating Science
- Examination
- Engagement

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

- 4. gather, process and present scientific information to solve problems

Assessment task

- Communicating Science