



EDUC109

Science: Today and Tomorrow

S2 Day 2019

Department of Educational Studies

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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

Unit convener

Hye Eun Chu

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Lab technician

Mayes Kanoun

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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

Assessment Presentation and 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
- It is the responsibility of the student to ensure that all assessments are successfully submitted through Turnitin.
- Faculty assignment cover sheets are NOT required.

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.

Please note:

- Students should regularly save a copy of all assignments before submission,
- Students are responsible for checking that their submission has been successful and has been submitted by the due date and time.

Assignment extensions and late penalties

- In general, there should be no need for extensions except through illness or misadventure that would be categorised as serious and unavoidable disruption according to the University definition of same, see: <https://students.mq.edu.au/study/my-study-program/special-consideration>
- Applications for extensions must be made via AskMQ according to the Special Consideration policy. Extensions can only be granted if they meet the Special Considerations policy and are submitted via <https://ask.mq.edu.au/>. This will ensure consistency in the consideration of such requests is maintained.
- 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.

Requesting a re-assessment of an assignment

If you have **evidence** that your task has been incorrectly assessed against the grade descriptors you can request a re-mark. To request a re-mark you need to contact the unit convenor within **7 days** of the date of return of the assignment and provide **a detailed assessment of your script against the task criteria**. Evidence from your assignment must be provided to support your judgements.

Note: Failed assessments cannot be re-marked as they are all double-marked as a part of the moderation process.

Please note: The outcome of a re-mark may be a **higher/lower or unchanged grade**. Grades are *standards referenced* and effort is NOT a criterion.

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. 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.

Students will be awarded grades ranging from HD to F according to guidelines set out in the policy: <https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/assessment-in-effect-from-session-2-2016>

The following generic grade descriptors provide university-wide standards for awarding final grades.

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.
Cr (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.
P (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
F (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 UG 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 progression through the degree.

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.

Assessment Tasks

Name	Weighting	Hurdle	Due
Perception of Science	10%	No	06/09/2019
Communicating Science	40%	No	11/10/2019
Examination	40%	No	Examination Period
Engagement	10%	No	All weeks

Perception of Science

Due: **06/09/2019**

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:

- 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
- 5 analyse and prepare science reports

Communicating Science

Due: **11/10/2019**

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
- 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
- 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.n.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.n.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.nsd.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 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 or if you are a Global MBA student contact globalmba.support@mq.edu.au

Department Procedures

In addition, the following policies and procedures of the Department of Educational Studies are applicable in this unit.

Attendance for undergraduate units

All Internal tutorials begin in Week 4 of Session and lecture begin in Week 3 of Session.

Activities completed during weekly tutorials 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.

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/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

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

If you are a Global MBA student contact globalmba.support@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
- 5 analyse and prepare science reports

Assessment task

- 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
- 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

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

- 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

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

- 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

Assessment tasks

- Communicating Science
- Engagement

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

- 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

Assessment tasks

- Perception of Science
- Communicating Science
- 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

- 3 perform required laboratory tasks and conduct practical work

Assessment tasks

- Communicating Science
- Engagement

Changes since First Published

Date	Description
31/07/2019	Assignment submission dates were changed.