EDUC108

Science: Today and Tomorrow

S1 Day 2015

Dept of Education

Contents

General Information

Unit convenor and teaching staff Hye Eun Chu hye-eun.chu@mq.edu.au
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:

Demonstrate understanding of essential science concepts across the four sciences

Reflect on your own science knowledge and understanding and how this was acquired

Perform laboratory tasks and conduct practical work

Gather, process and present scientific information to solve problems

Analyse and prepare science reports

Demonstrate your understanding of content covered in lectures and tutorials

General Assessment Information

- 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://mq.edu.au/about_us/offices_and_units/informatics/help
- Use headings to separate clearly the various sections of the assignment. Make sure you cover all the sections defined in the assignment description and clearly listed on the assessment feedback sheet included with the assignment cover sheet.
- Include both the School of Education assignment coversheet (download it at http://humansciences.mq.edu.au/current_students/undergraduate/assignment_cover_sheet) signed and dated along with the assignment feedback sheet (located in the unit guide) for the corresponding assignment. Then, submit your assignment electronically through Turnitin in iLearn.
- Make sure you keep a copy of your assignment in case of loss.
-

Assessment Tasks

Name	Weighting	Due
Images of science and scientis	15%	13 March 2015
Reporting science	35%	8 May 2015
Examination	50%	Week 14

Images of science and scientis

Due: **13 March 2015**
Weighting: **15%**

Assignment 1 (15%)

Date Due: Friday 13 March at 12 noon

Topic: Images of Science and Scientists

Introduction:

In the first week of this unit, you were asked to draw a scientist, to compare your drawing with that of others in the lecture and to reflect on the images of scientists portrayed in those drawings compared to scientists living and working today.

Aim:

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.

Procedure:

1. Ask 10 people (5 males and 5 females) of various ages to provide you with a drawing of a typical scientist. Provide them with an A4 sheet of paper and pencil and give them 10-15 minutes to complete the task.

2. These 10 people might ask you some questions such as:

Q: Do you want me to draw a chemist?

A: Please draw who ever come to mind.

Q: Can I put words on my picture?

A: Yes that is fine.

Q: Does the scientist have to be in a laboratory?

A: Wherever you like.

The purpose of these somewhat vague answers is to ensure that your participant draws what comes to their mind and NOT what you might imply they should draw. *Don't forget to thank them*.

3. Collect your 10 drawings and record their age and gender. Submit all de-identified drawings with your assignment.

4. Examine each drawing by comparing and contrasting these with your own.

Submission:

Prepare a report (800 words) which addresses the following.

1. Identify similarities and differences between the drawings you collected and your own. Present your findings in a table.

2. Discuss the images of science and scientists revealed in the drawings and the possible origins of these images.

3. Compare and contrast the stereotypical image of science/scientists with that of scientists working in the community.

Background Reading:

Feasey, R. (2012). Thinking and working scientifically. In K. Skamp (Ed.), *Teaching primary science constructively* (4th ed.) (pp. 53–55). Melbourne: Thomson.

On successful completion you will be able to:

- Reflect on your own science knowledge and understanding and how this was acquired

Reporting science

Due: **8 May 2015**
Weighting: **35%**

Assignment 2 (35% = 25% + 10%)

Date Due: Friday 8 May at 12 noon

Topic: Reporting Science

Introduction:

The way in which science is communicated depends on the topic, its context and the engagement with the audience. What is important is that science is communicated accurately and that readers/listeners can make sense of scientific information.

As part of this unit you will be conducting fieldwork in the local environment. The field work aims to consolidate and extend your growing knowledge of local plants and animals as well as assist you to identify and respond to environmental issues on campus. Your field observations may be incorporated into on-going environmental monitoring programs being conducted at the University.

This assignment provides an opportunity for you to formalise your field work experience in the form of two reports that will communicate your identification of an issue that needs to be addressed as part of on-campus sustainable management practice at the university in particular (Field Report: Part A 25%) and in the general community (Media article: Part B 10%).

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).

Field Report: Part A. 2000 words

Participate in the on-campus fieldwork scheduled for Wednesday 26 March [tutorial day]. Using data collected from your field work prepare a report which contains the following.

1. A description of the original landscape where Macquarie University now stands. This will include an illustrated discussion (using images collected from the field trip) of vegetation, geology and hydrology. (1200 words).

2. Identification of an issue relating to human impact on this local environment. Provide evidence (including data collected from the fieldwork) to support your case. (400 words)

3. Propose an action plan that can be implemented to reduce or eliminate this human impact. (400 words).

Media article: Part B. (650 words)

1. Source two contrasting articles that have been reported in the media in the last 12 months dealing with biodiversity on the local (Ryde/Lane Cove), state or national level.

Attach copies of these media articles to your assignment.

2. Identify the science content reported in each article, the level of understanding required of the reader and sources of evidence provided. State your rationale for choosing these articles and comment on the validity and reliability of the science reported in each. (400 words)

(Internet sites such as Wikipedia and the like are unacceptable).

3. Integrate this information with your experience of the fieldwork to prepare a media article that targets the local community. Your media article should integrate your results from Part A and the two relevant science reports from above. You are encouraged to use a variety of text types along photos and other visual representations. (250 words)

Background Reading:

AAAS. (2009). *Benchmarks online. Communication*. Retrieved on February 25, 2014, from http://www.project2061.org/publications/bsl/online/index.php?chapter=12

Benson, D., & Howell, J. (1990). *Taken for granted: The bushland of Sydney and its suburbs.* Kenthurst: Kangaroo Press.

Friends of Lane Cove National Park. (2007). A brief history of Lane Cove National Park. Retrieved on February 25, 2014 from http://www.friendsoflanecovenationalpark.org.au/AboutThePark/History.htm

Friends of Lane Cove National Park. (2007).What's flowering. Retrieved on February 25, 2014 from http://www.friendsoflanecovenationalpark.org.au/Flowering/WhatsFlowering.htm

Rennie, L. (2007). Values of science portrayed in out-of-school contexts. In Corrigan, D., Dillon, J. and Gunstone, R (Eds.) *The Re-Emergence of Values in Science Education*. Rotterdam: Sense Publications.

Further resources will be posted on the Unit iLearn site.

On successful completion you will be able to:

- Perform laboratory tasks and conduct practical work
- Gather, process and present scientific information to solve problems
- Analyse and prepare science reports

Examination

Due: **Week 14**
Weighting: **50%**

Examination (50%)

The examination for this unit is compulsory and will be held during the examination period (9 - 12 June).

Weighting: 50%

Length: 2hours 30 minutes plus 10 minutes reading time.

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 in the tutorials. It is essential that you have a strong understanding of the key science concepts in each of the major themes covered in this unit.

Weekly reading and a wider reading of science content material will enhance your understanding of these key science concepts. You are strongly advised to update and consolidate your understanding of basic science concepts by reading some of the science textbooks located in the Curriculum section of the library.

You are expected to present yourself for examination at the time and place designated in the University Examination Timetable. The timetable is available in draft form approximately eight weeks before the commencement of the examinations and in final form approximately four weeks before the commencement of the examinations.

http://students.mq.edu.au/student_admin/exams/

The only exception, not sitting the examination at the allocated time and place, is because of documented illness or unavoidable disruption. In these circumstances you may wish to consider applying for Special Consideration. Information about unavoidable disruption and the special consideration process is available at

http://ask.mq.edu.au/kb.php?record=ce7c4e38-4f82-c4d7-95b1-4e2ee8fd075f

If a supplementary examination is granted as a result of the Special Consideration process, then the examination will be scheduled after the conclusion of the official examination period. The policy of Macquarie University is NOT to set early examinations for individual or groups of students. All students are expected to ensure that they are available until the end of the teaching semester, that is, the final day of the official examination period.

On successful completion you will be able to:

- Demonstrate understanding of essential science concepts across the four sciences
- Demonstrate your understanding of content covered in lectures and tutorials

Delivery and Resources

Classes

EDUC108 has three contact hours per week – two lectures and one tutorial each of one-hour duration. Lectures are on Tuesdays at 3-5pm in W5A T1. Tutorials are held at 1pm, 2pm, and 3pm on Wednesdays and at 1pm, 2pm, and 4pm on Thursdays. ALL tutorials will be held in E7B 317 – Science Teacher Education laboratory. Due to teacher education students being off campus for their professional experience in schools, lectures and tutorials are suspended in the weeks of 20 April until 1May.

You are required to wear covered shoes in the laboratory – open toed shoes (thongs, sandals, ballet flats etc) eating and drinking are unsafe in the lab.

You are required to read all lecture notes, PowerPoint presentations and tutorial notes in readiness for the lectures and tutorial. These are available on-line in the unit iLearn https://ilearn.mq.edu.au/login/MQ/

Technology Requirements

Students in EDUC108 will need regular access to a computer and the Internet. Laptops are

available in the E7B317 for use during tutorials. There are a number of university computers in the Library, and in C5C (Rooms 211, 213 and 217). Computers in Room C5A210 can also be accessed at specified times. Most local libraries are also now linked to the internet.

The unit is supported by iLearn and by Echo360. Annotated 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 lecture and 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 EDUC108 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. Please do NOT contact unit staff regarding iLearn technical support.

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

Skamp, K. (Ed.) (2012). *Teaching primary science constructively* (4th ed.). Melbourne: Thomson. Primary teacher education students may choose to purchase this text which will support their work in science and technology throughout the degree and beyond.

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

Background readings in science

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

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

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

Dawkins, R. (1991). *The blind watchmaker*. London: Penguin.

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

Halvorsen, R. (2007). *The truth about vaccines*. London: Gibson Square.

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

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

Lindenmayer, D. (2008). *On borrowed time: Australia's environmental crisis and what we must do about it*. Camberwell, Victoria: CSIRO/Penguin.

Rosser, S. (2008). *The A-Z of global warming*. London Schmall World Publishing.

Sobel, D. (2005). *The planets*. London: Fourth Estate.

Trefil, J. (2008). *Why science?* New York: Teachers College Press.

Background readings in science for schools

Australian Academy of Science. (2005). *Primary Connections: Linking science with literacy*. Canberra: Australian Academy of Science.

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

Board of Studies, Teaching and Educational Standards. All NSW science syllabi and related documents are available from http://www.boardofstudies.nsw.edu.au/

Dawson, V., & Venville, G. (Eds.) (2007). *The art of teaching primary science*. Crows Nest: Allen and Unwin.

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.

Gillespie, H. (2007). *Learning and teaching with virtual learning environments*. Exeter: Learning Matters.

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

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 January 10, 2011, from http://www.acer.edu.au/research_reports/AER.html

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

Ward, H., Roden, J., Hewlett, C., & Foreman, J. (2008). *Teaching science in the primary classroom: A practical guide*. London: Sage

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.html

Grading Policy http://mq.edu.au/policy/docs/grading/policy.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Grievance Management Policy http://mq.edu.au/policy/docs/grievance_management/policy.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://informatics.mq.edu.au/help/.

When using the University's IT, you must adhere to the Acceptable Use 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

- Perform laboratory tasks and conduct practical work
- Gather, process and present scientific information to solve problems
- Analyse and prepare science reports

Assessment task

- Reporting science

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

- Demonstrate understanding of essential science concepts across the four sciences
- Perform laboratory tasks and conduct practical work
- Gather, process and present scientific information to solve problems
- Demonstrate your understanding of content covered in lectures and tutorials

Assessment tasks

- Images of science and scientis
- 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

- Reflect on your own science knowledge and understanding and how this was acquired
- Perform laboratory tasks and conduct practical work
- Gather, process and present scientific information to solve problems
- Analyse and prepare science reports

Assessment tasks

- Images of science and scientis
- 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

- Demonstrate understanding of essential science concepts across the four sciences
- Reflect on your own science knowledge and understanding and how this was acquired
- Perform laboratory tasks and conduct practical work
- Gather, process and present scientific information to solve problems
- Analyse and prepare science reports
- Demonstrate your understanding of content covered in lectures and tutorials

Assessment task

- Reporting 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

- Demonstrate understanding of essential science concepts across the four sciences
- Reflect on your own science knowledge and understanding and how this was acquired
- Analyse and prepare science reports
- Demonstrate your understanding of content covered in lectures and tutorials

Assessment tasks

- Images of science and scientis
- Reporting science
- 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

- Demonstrate understanding of essential science concepts across the four sciences
- Reflect on your own science knowledge and understanding and how this was acquired
- Analyse and prepare science reports

Assessment task

- Reporting science