



EDCU12040 *Biological and Earth and Space Sciences*

Term 1 - 2020

Profile information current as at 23/04/2024 04:16 pm

All details in this unit profile for EDCU12040 have been officially approved by CQUUniversity and represent a learning partnership between the University and you (our student). The information will not be changed unless absolutely necessary and any change will be clearly indicated by an approved correction included in the profile.

General Information

Overview

Biological and Earth and Space Sciences develops understanding of both the content and pedagogy required to teach Science in Primary and Early Childhood classrooms. Students are introduced to concepts around how children learn Science; the importance of Science education in an Australian and international context; and current views around effective pedagogical practice linked to research. The focus on pedagogy will be linked to two content areas from the Australian Curriculum: Biological sciences and Earth and Space sciences.

Details

Career Level: *Undergraduate*

Unit Level: *Level 2*

Credit Points: 6

Student Contribution Band: 7

Fraction of Full-Time Student Load: 0.125

Pre-requisites or Co-requisites

There are no requisites for this unit.

Important note: Students enrolled in a subsequent unit who failed their pre-requisite unit, should drop the subsequent unit before the census date or within 10 working days of Fail grade notification. Students who do not drop the unit in this timeframe cannot later drop the unit without academic and financial liability. See details in the [Assessment Policy and Procedure \(Higher Education Coursework\)](#).

Offerings For Term 1 - 2020

- Bundaberg
- Cairns
- Mackay
- Noosa
- Online
- Rockhampton

Attendance Requirements

All on-campus students are expected to attend scheduled classes – in some units, these classes are identified as a mandatory (pass/fail) component and attendance is compulsory. International students, on a student visa, must maintain a full time study load and meet both attendance and academic progress requirements in each study period (satisfactory attendance for International students is defined as maintaining at least an 80% attendance record).

Website

[This unit has a website, within the Moodle system, which is available two weeks before the start of term. It is important that you visit your Moodle site throughout the term. Please visit Moodle for more information.](#)

Class and Assessment Overview

Recommended Student Time Commitment

Each 6-credit Undergraduate unit at CQUniversity requires an overall time commitment of an average of 12.5 hours of study per week, making a total of 150 hours for the unit.

Class Timetable

[Regional Campuses](#)

Bundaberg, Cairns, Emerald, Gladstone, Mackay, Rockhampton, Townsville

[Metropolitan Campuses](#)

Adelaide, Brisbane, Melbourne, Perth, Sydney

Assessment Overview

1. **Presentation**

Weighting: 50%

2. **Practical and Written Assessment**

Weighting: 50%

Assessment Grading

This is a graded unit: your overall grade will be calculated from the marks or grades for each assessment task, based on the relative weightings shown in the table above. You must obtain an overall mark for the unit of at least 50%, or an overall grade of 'pass' in order to pass the unit. If any 'pass/fail' tasks are shown in the table above they must also be completed successfully ('pass' grade). You must also meet any minimum mark requirements specified for a particular assessment task, as detailed in the 'assessment task' section (note that in some instances, the minimum mark for a task may be greater than 50%). Consult the [University's Grades and Results Policy](#) for more details of interim results and final grades.

CQUniversity Policies

All University policies are available on the [CQUniversity Policy site](#).

You may wish to view these policies:

- Grades and Results Policy
- Assessment Policy and Procedure (Higher Education Coursework)
- Review of Grade Procedure
- Student Academic Integrity Policy and Procedure
- Monitoring Academic Progress (MAP) Policy and Procedure – Domestic Students
- Monitoring Academic Progress (MAP) Policy and Procedure – International Students
- Student Refund and Credit Balance Policy and Procedure
- Student Feedback – Compliments and Complaints Policy and Procedure
- Information and Communications Technology Acceptable Use Policy and Procedure

This list is not an exhaustive list of all University policies. The full list of University policies are available on the [CQUniversity Policy site](#).

Previous Student Feedback

Feedback, Recommendations and Responses

Every unit is reviewed for enhancement each year. At the most recent review, the following staff and student feedback items were identified and recommendations were made.

Feedback from Unit evaluation

Feedback

Assessment Task 1: Pecha Kucha

Recommendation

Rename 'My Library of Science Units' to 'Primary Connections' and place it within the Assessment Task 1 block to make this content easier to find.

Feedback from Unit evaluation

Feedback

Assessment Task 2: Digital Task Cards

Recommendation

Provide additional support for making web pages as this can be a steep learning curve.

Feedback from Unit evaluation

Feedback

Textbook readings

Recommendation

Reduce some of the textbook readings as these can be very time consuming, particularly from Gregson and Doidge (Eds., 2018).

Unit Learning Outcomes

On successful completion of this unit, you will be able to:

1. Evaluate examples of teaching practice in science to identify how connections are made to students' prior knowledge or experience to promote learning and inform pedagogical practice
2. Access/evaluate and apply professional literature on contemporary science education to develop a rationale for learning design
3. Analyse and incorporate content that recognises the experience of Aboriginal and Torres Strait Islander students in the science classroom
4. Select teaching and learning strategies that promote higher order thinking and scaffold students' understanding of core concepts in the areas of Biological and Earth and Space sciences
5. Create learning resources in which learner engagement is transformed by the use of ICT for collaboration and inquiry.

Successful completion of this unit provides opportunities for students to engage with the Australian Professional Standards for Teachers (Graduate Career Stage) focus areas of:

- 1.1 Physical, social and intellectual development and characteristics of students
- 1.2 Understand how students learn
- 1.4 Strategies for teaching Aboriginal and Torres Strait Islander students
- 2.1 Content and teaching strategies of the teaching area
- 2.2 Content selection and organisation
- 2.6 Information and Communication Technology (ICT)
- 3.3 Use teaching strategies
- 3.4 Select and use resources
- 4.1 Support student participation

Alignment of Learning Outcomes, Assessment and Graduate Attributes



Alignment of Assessment Tasks to Learning Outcomes

Assessment Tasks	Learning Outcomes				
	1	2	3	4	5
1 - Presentation - 50%	•	•	•		
2 - Practical and Written Assessment - 50%		•		•	•

Alignment of Graduate Attributes to Learning Outcomes

Graduate Attributes	Learning Outcomes				
	1	2	3	4	5
1 - Communication	•	•			•
2 - Problem Solving			•	•	•
3 - Critical Thinking	•	•	•	•	•
4 - Information Literacy	•	•	•	•	
5 - Team Work					
6 - Information Technology Competence				•	•
7 - Cross Cultural Competence	•		•		
8 - Ethical practice					
9 - Social Innovation					
10 - Aboriginal and Torres Strait Islander Cultures					

Alignment of Assessment Tasks to Graduate Attributes

Assessment Tasks	Graduate Attributes									
	1	2	3	4	5	6	7	8	9	10
1 - Presentation - 50%	•	•	•	•		•	•			
2 - Practical and Written Assessment - 50%	•	•	•	•		•	•			

Textbooks and Resources

Textbooks

EDCU12040

Prescribed

Connecting with Science Education

Edition: 2nd ed. (2018)

Authors: Gregson & Doidge (Eds.)

Oxford University Press

South Melbourne , VIC , Australia

ISBN: 9780190309343

Binding: Paperback

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Prescribed

Teaching Primary Science: Promoting Enjoyment and Developing Understanding

Edition: 3rd ed. (2018)

Authors: Loxley, Dawes, Nicholls & Dore

Routledge

New York , New York , USA

ISBN: 9781138651838

Binding: Paperback

Additional Textbook Information

These two textbooks will be used again in the third-year science unit *EDCU13017 Chemical and Physical Sciences*.

Copies can be purchased from the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code)

[View textbooks at the CQUniversity Bookshop](#)

IT Resources

You will need access to the following IT resources:

- CQUniversity Student Email
- Internet
- Unit Website (Moodle)

Referencing Style

All submissions for this unit must use the referencing style: [American Psychological Association 6th Edition \(APA 6th edition\)](#)

For further information, see the Assessment Tasks.

Teaching Contacts

Brendan Jacobs Unit Coordinator

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Schedule

Week 1: Theoretical frameworks for teaching science - 09 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 1) - Theoretical frameworks for teaching science	Gregson et al. (2018). Chapter 1 - What is science? Gregson et al. (2018). Chapter 2 - Becoming explorers of our world	

Week 2: Science and the cross-curriculum priorities - 16 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 2) - Science and the cross-curriculum priorities	Gregson et al. (2018). Chapter 3 - Making connections with students' world	

Week 3: The Australian Curriculum (Science) - 23 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 3) - The Australian Curriculum (Science)	Gregson et al. (2018). Chapter 4 - Engaging the Australian curriculum	

Week 4: Engaging learners in science - 30 Mar 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 4) - Engaging learners in science	Gregson et al. (2018). Chapter 5 - Reconnecting students with science	

Week 5: Curriculum design: The anatomy of a science unit - 06 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 5) - The anatomy of a science unit	Gregson et al. (2018). Chapter 6 - Planning creative and effective science lessons	

Vacation Week - 13 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic

Week 6: Working scientifically - 20 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 6) - Working scientifically	Gregson et al. (2018). Chapter 7 - Why we teach literacy in science	Pecha Kucha presentation Due: Week 6 Thursday (23 Apr 2020) 11:45 pm AEST

Week 7: STEM, STEAM and digital approaches to learning - 27 Apr 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 7) - STEM, STEAM and digital approaches to learning	Loxley et al. (2018). Chapter 9 - STEM education: Enriching the primary school experience	

Week 8: Biological sciences (Overview) - 04 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 8) - Biological sciences (Overview)	Loxley et al. (2018). Chapter 13 - Interdependence Loxley et al. (2018). Chapter 14 - Diversity	

Week 9: Biological sciences (Investigations) - 11 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 9) - Biological sciences (Investigations)	Loxley et al. (2018). Chapter 15 - Adaptation and evolution Loxley et al. (2018). Chapter 16 - Health and well-being	

Week 10: Earth and Space sciences (Overview) - 18 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 10) - Earth and Space sciences (Overview)	Loxley et al. (2018). Chapter 11 - The Earth and beyond	

Week 11: Earth and Space sciences (Investigations) - 25 May 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-Book on Moodle (Week 11) - Earth and Space sciences (Investigations)	Loxley et al. (2018). Chapter 12 - Energy and the well-being of the planet	

Week 12: Unit review and consolidation - 01 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
No E-Book	No readings	Digital Task Cards Due: Week 12 Thursday (4 June 2020) 11:45 pm AEST

Review/Exam Week - 08 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Exam Week - 15 Jun 2020

Module/Topic	Chapter	Events and Submissions/Topic
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Assessment Tasks

1 Pecha Kucha presentation

Assessment Type

Presentation

Task Description

Create a 'Pecha Kucha 20 x 20' presentation on one of the 10 research topics (listed below). Topics focus on contemporary issues in science education and research including how children learn science, the structure of the curriculum, and so on. Choose a *Primary Connections* unit from either Biological or Earth and Space sciences (available on Moodle). Your chosen *Primary Connections* unit will give you some context for addressing your research topic.

You also need to demonstrate your understanding of the three strands of the Australian Curriculum (Science), the three cross-curriculum priorities, and how these relate to your research topic and chosen *Primary Connections* unit.

Research topics:

1. The world is complex and ever changing – each day what counts as knowledge is challenged by new knowledge and process considerations. Using your selected *Primary Connections* unit, present a researched argument to support the claim that **inquiry-based learning** is the keystone to developing deeper science understandings in today's science classrooms.
2. Using your selected *Primary Connections* unit, identify what role **technology** could play in enriching student learning. Be sure to consider pedagogical approaches, assessment strategies, and any relevant learning theories.
3. One of the three cross-curriculum priorities in the Australian Curriculum is '**Aboriginal and Torres Strait Islander histories and cultures**'. Explain what this cross-curriculum priority is about and how it is embedded in the *Primary Connections* unit you have chosen. Be sure to consider pedagogical approaches as well as assessment strategies.
4. One of the three cross-curriculum priorities in the Australian Curriculum is '**Sustainability**'. Explain what this cross-curriculum priority is about and how it is embedded in the *Primary Connections* unit you have chosen. Be sure to consider pedagogical approaches as well as assessment strategies.
5. '**Engagement**' is the first stage of the 5Es model that underpins the *Primary Connections* curricula. Using the *Primary Connections* unit you have selected, explain why engagement is so important in science teaching and outline the strategies and techniques you plan to use to engage your students in the future, with particular attention to 'identifying misconceptions' and 'diagnostic techniques'.
6. Using the *Primary Connections* unit you have selected, identify some **potential barriers to student engagement** in science learning. Choosing a selection of three barriers, describe in further detail how you might overcome these barriers using engagement strategies.
7. Referring to the *Primary Connections* unit you have selected, explain the value of using the **5Es** teaching and learning model and highlight the connection between planning, teaching and assessing science understanding.
8. Discuss some of the reasons why **STEM** education is becoming increasingly important in schools all around the world. Referring to the *Primary Connections* unit you have selected, show examples of where STEM is incorporated and/or places where STEM could logically be incorporated.
9. Referring to the *Primary Connections* unit you have selected, explain the importance of an understanding of '**working scientifically**'. Outline the importance of connecting children's scientific learning to their 'real' world and the way that scientists work (include links to research). How can you make science learning authentic and make connections to the scientific community?
10. Communicating science using **narrative techniques** can be valuable and enhance children's engagement. Using two examples, explain and justify how narrative and storytelling can be used to add richness to children's learning in the *Primary Connections* unit you have selected. Be sure that you make links to research to justify your position.

Assessment Due Date

Week 6 Thursday (23 Apr 2020) 11:45 pm AEST

Please submit through Moodle

Return Date to Students

Week 9 Thursday (14 May 2020)

Feedback on this assessment task will be returned following moderation and in sufficient time to inform students in preparation for Assessment Task 2.

Weighting

50%

Assessment Criteria

1. Quality and depth of content for a chosen science education issue from the 'Research topics' list using authoritative sources such as journal articles
2. Relevance and/or alignment between the research topic and a *Primary Connections* unit (Biological or Earth and Space sciences)
3. Demonstrated knowledge and understanding of the three strands of the Australian Curriculum (Science)
4. Demonstrated knowledge and understanding of the cross-curriculum priorities of the Australian Curriculum and their relevance to both the research topic and *Primary Connections* unit.
5. Clear and concise presentation consistent with 'Pecha Kucha 20 x 20' specifications

Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)

Submission

Online

Submission Instructions

Submit online via Moodle

Learning Outcomes Assessed

- Evaluate examples of teaching practice in science to identify how connections are made to students' prior knowledge or experience to promote learning and inform pedagogical practice
- Access/evaluate and apply professional literature on contemporary science education to develop a rationale for learning design
- Analyse and incorporate content that recognises the experience of Aboriginal and Torres Strait Islander students in the science classroom

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence

2 Digital Task Cards

Assessment Type

Practical and Written Assessment

Task Description

Part A: Choose two items from your pedagogical toolkit to write about. The idea of the 'toolkit' is that your practice will continually evolve to include numerous strategies, resources and activities to help engage students. Examples include problem-based learning, worksheets or components of the inquiry method such as 'questioning and predicting'. Other examples include resources such as online simulations, explanatory videos and even songs.

By identifying and explaining these items you should state what you like about each one. Remember that you are holding up these two items as good examples of practice in science education so only choose things that you approve of. Use professional literature such as journal articles to discuss any pedagogical issues relating to your chosen items. For example, for *explanatory videos* you could discuss 'cognitive load' and how content should be age appropriate and not too easy or difficult.

The word count for Part A is not stated (1,000 - 2,000 words guide). There is no word count for Part B.

Part B: Develop TWO digital task cards that could be used to scaffold independent learning in science. The cards should demonstrate a clear understanding of the items selected in Part A and use content from the two sub-strands of Biological

(for one card) and Earth and Space sciences (for the other card). The cards should cover a range of activities and include:

- **Biological sciences:** A card suitable for use by learners in a primary classroom (select one year level from Foundation to Year 6). This card must be printable and suitable for a student to use with minimal teacher support.
- **Earth and Space sciences:** A card suitable for use by learners in a different primary classroom (select one year level from Foundation to Year 6). This card must be printable and suitable for a student to use with minimal teacher support.

Each card should clearly identify the learning outcomes from the Australian Curriculum (Science) that it supports. The card should also contain basic instructions for use but most of this information is best written on the website that the task card links to. Any hyperlinks that are used must work and login details must be provided if you use a site which requires registration. There should also be evidence of differentiation to show that you have carefully matched the activities with the age group and ability level of your intended student. Details on how to approach differentiation are provided in the Assessment Task 2 template.

Assessment Due Date

Week 12 Thursday (4 June 2020) 11:45 pm AEST

Please submit through Moodle

Return Date to Students

Exam Week Thursday (18 June 2020)

Feedback on this assessment task will be returned following moderation.

Weighting

50%

Assessment Criteria

1. Selection and appropriate use of teaching strategies and resources that support the processes of working scientifically.
2. Knowledge and understanding of the use of ICT in supporting student-centred learning and engagement.
3. Relevance of the chosen resources for the intended age group and evidence of differentiation for diverse learners.
4. Demonstrated knowledge and understanding of the content from the two sub-strands of Biological and Earth and Space sciences.

Referencing Style

- [American Psychological Association 6th Edition \(APA 6th edition\)](#)

Submission

Online

Submission Instructions

Submit online via Moodle

Learning Outcomes Assessed

- Access/evaluate and apply professional literature on contemporary science education to develop a rationale for learning design
- Select teaching and learning strategies that promote higher order thinking and scaffold students' understanding of core concepts in the areas of Biological and Earth and Space sciences
- Create learning resources in which learner engagement is transformed by the use of ICT for collaboration and inquiry.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy
- Information Technology Competence
- Cross Cultural Competence

Academic Integrity Statement

As a CQUniversity student you are expected to act honestly in all aspects of your academic work.

Any assessable work undertaken or submitted for review or assessment must be your own work. Assessable work is any type of work you do to meet the assessment requirements in the unit, including draft work submitted for review and feedback and final work to be assessed.

When you use the ideas, words or data of others in your assessment, you must thoroughly and clearly acknowledge the source of this information by using the correct referencing style for your unit. Using others' work without proper acknowledgement may be considered a form of intellectual dishonesty.

Participating honestly, respectfully, responsibly, and fairly in your university study ensures the CQUniversity qualification you earn will be valued as a true indication of your individual academic achievement and will continue to receive the respect and recognition it deserves.

As a student, you are responsible for reading and following CQUniversity's policies, including the [Student Academic Integrity Policy and Procedure](#). This policy sets out CQUniversity's expectations of you to act with integrity, examples of academic integrity breaches to avoid, the processes used to address alleged breaches of academic integrity, and potential penalties.

What is a breach of academic integrity?

A breach of academic integrity includes but is not limited to plagiarism, self-plagiarism, collusion, cheating, contract cheating, and academic misconduct. The Student Academic Integrity Policy and Procedure defines what these terms mean and gives examples.

Why is academic integrity important?

A breach of academic integrity may result in one or more penalties, including suspension or even expulsion from the University. It can also have negative implications for student visas and future enrolment at CQUniversity or elsewhere. Students who engage in contract cheating also risk being blackmailed by contract cheating services.

Where can I get assistance?

For academic advice and guidance, the [Academic Learning Centre \(ALC\)](#) can support you in becoming confident in completing assessments with integrity and of high standard.

What can you do to act with integrity?



Be Honest

If your assessment task is done by someone else, it would be dishonest of you to claim it as your own



Seek Help

If you are not sure about how to cite or reference in essays, reports etc, then seek help from your lecturer, the library or the Academic Learning Centre (ALC)



Produce Original Work

Originality comes from your ability to read widely, think critically, and apply your gained knowledge to address a question or problem