



EDCU13017 Chemical and Physical Sciences

Term 2 - 2020

Profile information current as at 27/04/2024 06:37 am

All details in this unit profile for EDCU13017 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

In Chemical and Physical Sciences, students apply theoretical concepts and current research related to teaching and learning in Science to engage in authentic evaluation and pedagogical design practices. Chemical and Physical Sciences examines both theoretical perspectives and the content and pedagogy required to teach Science in Primary and Early Childhood classrooms. Students develop understanding of the content and structure of these two strands in the Australian Curriculum and build on the knowledge and skills they developed in the Biological and Earth and Space Science unit to further examine views around best practice in Science pedagogy linked to current research. Chemical and Physical Sciences includes an emphasis on assessment practices in Science which can be applied to other strands of this learning area. Planning to teach and assess students' understanding of Science is addressed with an emphasis on how best to engage students in this learning area and scaffold understanding to enhance the ability to provide scientific explanations for phenomena.

Details

Career Level: *Undergraduate*

Unit Level: *Level 3*

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 2 - 2020

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

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. **Practical Assessment**

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 Student evaluation

Feedback

Zoom sessions

Recommendation

Maintain live (or pre-recorded) science experiments in the Zoom sessions to give distance students access to practical science activities.

Feedback from Student evaluation

Feedback

Reference list

Recommendation

Continue to maintain an updated reference list in APA6 format of all cited materials throughout the term.

Feedback from Student evaluation

Feedback

E-Books

Recommendation

Remove the 5E categories from the five subheadings of the E-Book pages as they were sometimes not applicable.

Unit Learning Outcomes

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

1. Evaluate examples of teaching and assessment practice in Science to identify how connections are made to students' prior knowledge or experience to promote learning
2. Access and apply professional literature on contemporary Science education to critically evaluate or justify planning and assessment practices
3. Plan lesson sequences that use appropriate research-based teaching strategies and ICTs to structure content and address students' possible misconceptions in Science
4. Develop diagnostic, formative and summative assessment tools that identify students' understanding of scientific phenomena
5. Select assessment strategies that engage students in active learning, promote higher order thinking and scaffold students' understanding of core concepts in the areas of Chemical and Physical sciences.

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
- 2.1 Content and teaching strategies of the teaching area
- 2.2 Content selection and organisation
- 2.3 Curriculum, assessment and reporting
- 2.6 Information and Communication Technology (ICT)
- 3.2 Plan, structure and sequence learning programs
- 3.3 Use teaching strategies
- 3.4 Select and use resources
- 3.6 Evaluate and improve teaching programs
- 4.1 Support student participation
- 5.1 Assess student learning
- 5.4 Interpret student data

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 - Practical Assessment - 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 - Practical Assessment - 50%		•	•	•		•	•			
2 - Practical and Written Assessment - 50%	•	•	•	•						

Textbooks and Resources

Textbooks

EDCU13017

Prescribed

Connecting with science education

Edition: 2nd ed. (2018)

Authors: Gregson & Doidge (Eds.)

Oxford University Press

South Melbourne , VIC , Australia

ISBN: 9780190309343

Binding: Paperback

EDCU13017

Prescribed

Teaching primary science: promoting enjoyment and developing understanding

Edition: 3rd ed. (2018)

Authors: Loxley, Dawes, Nicholls & Dore

Routledge

New York , NY , USA

ISBN: 9781138651838

Binding: Paperback

Additional Textbook Information

If you prefer to study with a paper copy, they are available at the CQUni Bookshop here: <http://bookshop.cqu.edu.au> (search on the Unit code). eBooks are available at the publisher's website.

[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 7th Edition \(APA 7th edition\)](#)

For further information, see the Assessment Tasks.

Teaching Contacts

Brendan Jacobs Unit Coordinator

b.jacobs@cqu.edu.au

Schedule

Week 1 - Pedagogical frameworks in science - 13 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Pedagogical frameworks in science	Loxley (2018) Chapters 1, 2 (For those students with previous version: Loxley (2014) Chapters 1, 2)	Register for free teacher accounts with Scootle and Science by Doing (if you haven't already done so).

Week 2 - Scientific investigation processes - 20 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Scientific investigation processes	Loxley (2018) Chapters 3, 4 (For those students with previous version: Loxley (2014) Chapters 3, 4)	

Week 3 - Chemical sciences sub-strand overview - 27 Jul 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Chemical sciences sub-strand overview	Loxley (2018) Chapters 5, 6 (For those students with previous version: Loxley (2014) Chapters 5, 6)	

Week 4 - Assessment in science - 03 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Assessment in science	Loxley (2018) Chapters 7 (For those students with previous version: Loxley (2014) Chapter 7) Gregson (2018) Chapter 8 (For those students with previous version: Gregson (2012) Chapter 8)	

Week 5 - Physical sciences sub-strand overview - 10 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Physical sciences sub-strand overview	Loxley (2018) Chapter 10 (For those students with previous version: Loxley (2014) Chapter 9)	Scientific concepts and alternate conceptions Due: Week 5 Thursday (13 Aug 2020) 11:45 pm AEST

Vacation Week - 17 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic

Week 6 - Chemical sciences content (1/3) - 24 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Chemistry	Gregson (2018) Chapter 11	

Week 7 - Chemical sciences content (2/3) - 31 Aug 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: The particle nature of materials	Loxley (2018) Chapter 17 (For those students with previous version: Loxley (2014) Chapter 16)	

Week 8 - Chemical sciences content (3/3) - 07 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Changing materials	Loxley (2018) Chapter 18 (For those students with previous version: Loxley (2014) Chapter 17)	

Week 9 - Physical sciences content (1/3) - 14 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Physics	Gregson (2018) Chapter 13	

Week 10 - Physical sciences content (2/3) - 21 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic
E-BOOK on Moodle: Electricity and magnetism, Forces and motion	Loxley (2018) Chapters 19, 20 (For those students with previous version: Loxley (2014) Chapters 18, 19)	

Week 11 - Physical sciences content (3/3) - 28 Sep 2020

Module/Topic	Chapter	Events and Submissions/Topic

E-BOOK on Moodle: Light and sound
Loxley (2018) Chapters 21, 22
(For those students with previous
version: Loxley (2014) Chapters 20,
21)

Week 12 - Unit review and consolidation - 05 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
		Evaluation of two Primary Connections science units Due: Week 12 Thursday (8 Oct 2020) 11:45 pm AEST

Review/Exam Week - 12 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Exam Week - 19 Oct 2020

Module/Topic	Chapter	Events and Submissions/Topic
--------------	---------	------------------------------

Assessment Tasks

1 Scientific concepts and alternate conceptions

Assessment Type

Practical Assessment

Task Description

People have many preconceptions and alternate conceptions about the scientific world. People think about what they do and see, all the time constructing shared explanations of how objects and events work. The building of these ideas can often result in misconceptions about how the world works.

Part A Case Study: Through research, select a scientific concept taught in either the Chemical sciences sub-strand or the Physical sciences sub-strand of the Australian Curriculum (Science) that is commonly misunderstood or poorly understood. Misconceptions can often be found in the media, in popular culture or during conversations with children.

- Identify a learner context that you choose to work with from Foundation to Year 6 (e.g. Year 2).
- Design/select a diagnostic tool to critically analyse the understanding that this learner has about your selected concept.
- Include examples and a comparison of the language used by the learner to explain this science concept.

Part B Replacing Alternate Conceptions: Develop a learning sequence that works to replace the alternate conception identified during Part A.

- The pedagogy used in your learning sequence must be linked to current research on effective teaching and learning practice and take account of the cognitive and language characteristics of the learner in the chosen year level.
- The learning sequence should use ICT where appropriate.
- You need to include a range of teaching strategies.
- Outline how you would report your findings to students, parents/carers, teachers and academics.

Word Limit - 3,000 words

Assessment Due Date

Week 5 Thursday (13 Aug 2020) 11:45 pm AEST

Please upload assignments via MOODLE

Return Date to Students

Assessment tasks will be returned once moderation processes have occurred and in time for you to utilise feedback in the following assessment task.

Weighting

50%

Assessment Criteria

1. Scientific concept identified. Learner context identified.

2. Appropriate choice of diagnostic tool including examples of the language surfaced from using the tool.
 3. Comparison of the alternate conception with the currently held scientific conception.
 4. Quality of learning sequence and appropriate use of ICT
 5. Communicates findings using appropriate language for context (students, parents/carers, teachers, academics).
- The full rubric for this assessment task can be downloaded from the Moodle site for this unit.

Australian Professional Standards for Teachers (Graduate Career Stage) demonstrated:

- 1.1 Physical, social and intellectual development and characteristics of students.
- 1.2 Understand how learners learn.
- 2.1 Content and teaching strategies of the teaching area.
- 2.2 Content selection and organisation.
- 2.6 Information and Communication Technology (ICT)
- 3.2 Plan, structure and sequence learning programs.
- 3.3 Use teaching strategies.
- 3.4 Select and use resources.
- 5.1 Assess student learning.
- 5.4 Interpret student data.
- 5.5 Reporting on Student Achievement

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

Upload file via the Unit MOODLE.

Learning Outcomes Assessed

- Evaluate examples of teaching and assessment practice in Science to identify how connections are made to students' prior knowledge or experience to promote learning
- Access and apply professional literature on contemporary Science education to critically evaluate or justify planning and assessment practices
- Plan lesson sequences that use appropriate research-based teaching strategies and ICTs to structure content and address students' possible misconceptions in Science
- Develop diagnostic, formative and summative assessment tools that identify students' understanding of scientific phenomena

Graduate Attributes

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

2 Evaluation of two Primary Connections science units

Assessment Type

Practical and Written Assessment

Task Description

- Choose two *Primary Connections* units, one from the Physical sciences sub-strand and one from the Chemical sciences sub-strand, taught in a primary school for a particular year level.
- Identify the types of assessment used in each unit and how they demonstrate student understanding and motivate or engage students in learning.
- In light of current research around effective science assessment practice, evaluate the diagnostic, formative and summative assessments used in these units of work.
- Make two recommendations for improvements in *each* of these *Primary Connections* units and include how you would incorporate assessment for each recommendation.
- These recommendations must be justified by links to current research and should include redesign or development of appropriate tools and/or techniques for promoting engagement and making reliable, consistent and comparable judgements on student learning.

Word Limit - 3,000 words

Assessment Due Date

Week 12 Thursday (8 Oct 2020) 11:45 pm AEST

Return Date to Students

Assessment will be returned following moderation and in accordance with university policy on certification of grades.

Weighting

50%

Assessment Criteria

1. Sophisticated explanation of the diagnostic, formative and summative assessments used in each of the *Primary Connections* units.
2. Comprehensive explanation of how the types of assessment used in the units of work demonstrate student understanding and motivate or engage students in their own learning.
3. Two appropriate recommendations are identified for improvement in the assessment items of each unit and justified by links to current research.
4. Cohesive writing consistent with academic conventions. Extensive use of relevant and credible sources for explanation of scientific concepts.

The full rubric for this assessment task can be downloaded from the Moodle site for this unit.

Australian Professional Standards for Teachers (Graduate Career Stage) demonstrated:

2.1 Content and teaching strategies of the teaching area.

2.3 Curriculum, assessment and reporting.

3.6 Evaluate and improve teaching programs.

4.1 Support student participation.

5.1 Assess student learning.

Referencing Style

- [American Psychological Association 7th Edition \(APA 7th edition\)](#)

Submission

Online

Submission Instructions

Upload file via the Unit MOODLE.

Learning Outcomes Assessed

- Evaluate examples of teaching and assessment practice in Science to identify how connections are made to students' prior knowledge or experience to promote learning
- Access and apply professional literature on contemporary Science education to critically evaluate or justify planning and assessment practices
- Develop diagnostic, formative and summative assessment tools that identify students' understanding of scientific phenomena
- Select assessment strategies that engage students in active learning, promote higher order thinking and scaffold students' understanding of core concepts in the areas of Chemical and Physical sciences.

Graduate Attributes

- Communication
- Problem Solving
- Critical Thinking
- Information Literacy

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