

School of Education

EDST6927 Chemistry/Biology Method 1

Term 1 2022

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IMPORTANT:

For student policies and procedures relating to assessment, attendance and student support, please see website, https://education.arts.unsw.edu.au/students/courses/course-outlines/

The School of Education acknowledges the Bedegal people as the traditional custodians of the lands upon which we learn and teach.

1. LOCATION

Faculty of Arts, Design & Architecture School of Education EDST6927 Chemistry/Biology Method 1 (6 units of credit) Term 1 2022

2. STAFF CONTACT DETAILS

Course Coordinator: Oriana Miano

Email: <u>o.miano@unsw.edu.au</u>

Availability: Please email for appointment

Tutor: Jennifer Ming
Email: j.ming@unsw.edu.au

Availability: Please email for appointment

3. COURSE DETAILS

Course Name	Chemistry/Biology Method 1
Credit Points	6 units of credit (uoc)
Workload	Includes 150 hours including class contact hours, readings, class preparation,
	assessment, follow up activities, etc.
Schedule	EDST E 2022 Class Utilisation Summary (unsw.edu.au)

SUMMARY OF COURSE

This initial teacher education course is designed to develop appropriate pedagogies for teaching Chemistry/Biology, as well as offering an insight into the principles and practices for learning Chemistry/Biology within the broader secondary Science continuum. Initial teacher education students will develop skills in planning and teaching lessons, contextualising Chemistry/Biology within the broader school curriculum, managing practical work in science classrooms and integrating ICT resources into lessons. Important issues such as student prior learning, assessment, student differences and safety are also considered. Initial teacher education students will critically evaluate models of pedagogy and the features of effective classroom practice. The course focuses on the requirements and philosophy of the NSW Chemistry/Biology Stage 6 Syllabus, including outcomes and content, syllabus elements and support documents.

STUDENT LEARNING OUTCOMES

Outcome		Assessment/s
1	Identify foundational aspects and structure of the NSW Chemistry/Biology Stage 6 Syllabus and the depth of subject knowledge required to implement the syllabus.	1, 2
2	Evaluate how student characteristics affect learning and evaluate implications for teaching students with different characteristics and from diverse backgrounds.	1
3	Use a range of strategies to plan and teach effective lessons to engage all students, address relevant syllabus outcomes and ensure a safe learning environment.	1
4	Plan teaching strategies which effectively communicate scientific thinking and problem-solving techniques; planning, conducting, and communicating results of investigations; and central ideas in Chemistry/Biology and common student misconceptions.	1, 2
5	Design and evaluate formative assessment strategies and include assessment for learning and as learning opportunities in Chemistry/Biology.	1, 2
6	Select appropriate resources, including ICT, to engage students and expand learning opportunities.	2
7	Describe strategies that support students' wellbeing and safety in the Chemistry/Biology classroom setting, including curriculum and legislative requirements.	2

AUSTRALIAN PROFESSIONAL STANDARDS FOR TEACHERS

Standard		Assessment/s
1.1.1	Demonstrate knowledge and understanding of physical, social, and intellectual	1
1.1.1	development and characteristics of students and how these may affect learning.	
1.2.1	Demonstrate knowledge and understanding of research into how students learn and	1, 2
1.2.1	the implications for teaching.	
	Demonstrate knowledge of teaching strategies that are responsive to the learning	1, 2
1.3.1	strengths and needs of students from diverse linguistics, cultural, religious, and	
	socioeconomic backgrounds.	
	Demonstrate broad knowledge and understanding of the impact of culture, cultural	2
1.4.1	identity, and linguistic background on the education of students from Aboriginal and	
	Torres Strait Islander backgrounds.	
1.5.1	Demonstrate knowledge and understanding of strategies for differentiating teaching	2
1.0.1	to meet the specific learning needs of students across the full range of abilities.	
2.1.1	Demonstrate knowledge and understanding of the concepts, substance and	1, 2
2.1.1	structure of the content and teaching strategies of the teaching area.	
2.2.1	Organise content into an effective learning and teaching sequence.	1, 2
2.3.1	Use curriculum, assessment and reporting knowledge to design learning sequences	1, 2
2.3.1	and lesson plans.	
2.4.1	Demonstrate broad knowledge of, understanding of and respect for Aboriginal and	2
2.4.1	Torres strait Islander histories, cultures, and languages.	
2.5.1	Know and understand literacy and numeracy teaching strategies and their	1
2.3.1	application in teaching areas.	
2.6.1	Implement teaching strategies for using ICT to expand curriculum learning	1, 2
2.0.1	opportunities for students.	
3.1.1	Set learning goals that provide achievable challenges for students of varying	1, 2
3.1.1	characteristics.	
3.2.1	Plan lesson sequences using knowledge of student learning, content, and effective	2
3.2.1	teaching strategies.	
3.3.1	Include a range of teaching strategies.	1, 2
2/1	Demonstrate knowledge of a range of resources including ICT that engage students	1, 2
3.4.1	in their learning.	

3.5.1	Demonstrate a range of verbal and non-verbal communication strategies to support	1, 2
	student engagement.	
3.6.1	Demonstrate broad knowledge of strategies that can be used to evaluate teaching	2
	programs to improve student learning.	
4.2.1	Demonstrate the capacity to organise classroom activities and provide clear	1
	directions.	
4.4.1	Describe strategies that support students' wellbeing and safety working within	1
	school and/or system, curriculum, and legislative requirements.	
6.3.1	Seek and apply constructive feedback from supervisors and teachers to improve	2
	teaching practices.	
7.1.1	Understand and apply the key principles described in codes of ethics and conduct	2
7.1.1	for the teaching profession.	

NATIONAL PRIORITY AREA ELABORATIONS

Priority area		Assessment/s
A. Aboriginal and Torres Strait Islander Education	4, 7	2
B. Classroom Management	1	1
C. Information and Communication Technologies	1, 3-6, 10, 12	1, 2
D. Literacy and Numeracy	1, 3-5, 8-12, 18-19	1, 2
E. Students with Special Educational Needs	7	1, 2
F. Teaching Students from Non-English-Speaking Backgrounds	4-5	1, 2

4. RATIONALE FOR THE INCLUSION OF CONTENT AND TEACHING APPROACH

Lectures, tutorials, and assignments will cover a variety of approaches to teaching and learning in the Chemistry/Biology classroom. Emphasis will be placed on the relationship between the nature and practice of Chemistry/Biology, the role and value of Chemistry and Biology in society and models of pedagogy for teaching and assessing in Chemistry and Biology. A particular focus will be on strategies that can promote student engagement and achievement in Chemistry and Biology and common student misconceptions.

Student-centred activities will form the basis of the course. These activities will draw on the prior discipline knowledge of the students and will allow them to engage in relevant and challenging experiences that mirror those they will be expected to design for the range of secondary students they will later teach.

5. TEACHING STRATEGIES

- Explicit teaching to foster an understanding of students' different approaches to learning and the use of a range of teaching strategies to foster interest and support learning
- Small group cooperative learning to develop teamwork in an educational context and to demonstrate the use of group structures to address teaching and learning goals
- Structured occasions for reflection on learning to allow students to reflect critically on and improve teaching practice
- Extensive opportunities for whole group and small group dialogue and discussion, allowing students the opportunity to demonstrate their capacity to communicate and liaise with the diverse members of an education community, and to demonstrate their knowledge and understanding of method content.
- Online learning from readings on the Moodle website and online discussions
- Microteaching: students will prepare and deliver a ten-minute demonstration lesson to their peers
- In tutorials, students will work in small groups to develop diverse products such as contexts, sections of units of work, lesson plans, teaching resources, and assessment tasks. Each group will upload and share their work in progress to Moodle. A debriefing session will be conducted after work submission during each tutorial.

These activities will occur in a classroom climate that is supportive and inclusive of all learners.

6. COURSE CONTENT AND STRUCTURE

Module	Lecture	Tutorial
1	 Introduction to course structure and requirements Developing contexts: (1) the value of Biology; (2) making Chemistry/Biology relevant in the broader school curriculum; and (3) incorporating the nature of scientific thinking, problemsolving techniques, planning, conducting, and communicating results of investigations What makes a good lesson? 	 Place of Chemistry/Biology across the continuum of learning in Science K-12 Addressing stereotypes in relation to studying Biology Research on how students learn Chemistry/Biology Developing a teacher network and resource bank Note: the focus of content in lectures, tutorials and assessment in Term is the Year 11 course (Modules 1-4)
2	 How Stage 6 students learn Chemistry/Biology Deconstructing the Stage 6 Chemistry/Biology Syllabus: structure, requirements, and associated documents 	 Using curriculum documents and syllabi Eliciting prior knowledge. Selecting and sequencing content. Long & short-term planning. Planning for student-centred learning Strategies for teaching Chemistry/Biology in Stage 6
3	 Planning for the mixed ability Stage 6 classroom, including selection of appropriate digital resources, and differentiation Demonstration of microteaching for Stage 6 	 Developing a repertoire of teaching strategies for Chemistry/Biology teaching; catering for diverse learners Teaching strategies to respond to individual needs and backgrounds Importance of matching teaching strategies to individual needs
4	 Addressing the Working Scientifically Skills in Stage 6 to encourage scientific thinking and problem-solving Incorporation of literacy, digital literacy, and numeracy strategies 	Developing a repertoire of teaching strategies for the teaching of working scientifically skills, literacy, digital literacy, and numeracy in the Stage 6 Chemistry/Biology Classroom Microteaching
5	Encouraging Deep Learning in Stage 6 Chemistry/Biology Inquiry & Problembased Learning Planning for studentcentred learning Role of Direct Instruction	Developing a repertoire of teaching strategies to encourage Deep Learning in the Stage 6 Chemistry/Biology Classroom Microteaching
6	Addressing cross-curriculum priorities and general capabilities	Developing culturally responsive teaching strategies and resources e.g., Embedding Aboriginal and Torres Strait Islander histories and Cultures in Chemistry/Biology Microteaching

7	 Planning Units of Work: using the Stage 6 Chemistry/Biology Syllabus Using NESA support materials 	Content selection and scope of content for effective lesson sequences for the Year 11 Chemistry/Biology course Microteaching					
	Method Break	Method Break					
9 (Online, F2F, Asynchronous)	Depth Studies: individual versus collaborative projects; presenting research/fieldwork reports	 Designing possible depth study tasks in Stage 6 Chemistry/Biology Writing rubrics and marking guidelines Formative assessment strategies- Self and peer assessment 					
10	 Investigating Science- a complement to Stage 6 Chemistry/Biology 	Unpacking the Syllabus					
11	 Preparing for Professional Experience Organisational strategies for teaching Being a reflective teacher 	Becoming a reflective teacher through the feedback cycle Completing myExperience					
Professional Experience 1							

7. RESOURCES

Each student is required to obtain from the NESA website the following documents: Stage 6 Chemistry/Biology Syllabus and the Support Materials.

https://syllabus.nesa.nsw.edu.au/Chemistry/-stage6/ and https://syllabus.nesa.nsw.edu.au/biology-stage6/

It is not necessary to purchase secondary Chemistry/Biology textbooks for this course. Textbooks will not usually be used during tutorials.

The Flipped Classroom

http://www.teacherstandards.aitsl.edu.au/Illustrations/ViewIOP/IOP00173/index.html

TPACK (created by Dr. Matthew Koehler and Dr. Punya Mishra http://www.tpack.org/), Technological Pedagogical Content Knowledge (TPACK) is a framework that identifies the knowledge teachers need to teach effectively with technology.

S A M R (created by Dr. Ruben R. Puentedura); provides a framework to answer the question of what types of technology use would have greater or lesser effects upon student learning.

<u>Rural & Distance Education NSW</u>: A local resource presenting both frameworks, http://rde.nsw.edu.au/tpack-samr

Teaching Teachers for the Future - What is TPACK? http://www.ttf.edu.au/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/what-is-tpack/

Reflections of pre-service teachers, http://www.ttf.edu.au/psts-talk.html; this series of video clips shows the reflections of several pre-service teachers each of whom trialled one of the twelve Teaching Teachers for the Future (TTF) Australian Curriculum resource packages with a practicum class. At the end of their lesson the pre-service teachers were invited to reflect on the experience of working with the resource package and adapting it to their class situation. They were also asked to reflect on their understanding of TPACK.

Student teachers are encouraged to set up their own blog (It is free) at Edublog http://edublogs.org/ to create and share resources and lessons they create.

Additional readings

- Anstey, M. & Bull, G. (2006) Teaching and learning multiliteracies: Changing times, changing literacies. Curriculum Press, Melbourne.
- Attwood, B. (2005), Telling the truth about Aboriginal history. All and Unwin, Crows Nest.
- Bryson, B. (2004) A Short History of Nearly Everything, Black Swan, London
- Finger, G., Russell, G., Jamieson-Proctor, R. & Russell, N. (2006) Transforming Learning with ICT Making IT Happen. Pearson Australia
- Gibbons, P (2002) Scaffolding language, scaffolding learning: Teaching second language learners in the mainstream classroom. Portsmouth, Heinemann
- Hazzard, J. (2004) The Art of Teaching Science: Inquiry and Innovation in Middle School and High School
- Henderson, R. (2012). Teaching Literacies. Pedagogies and Diversity in the Middle Years, Oxford University Press, Australia
- Hyde, M., Carpenter, L. & Conway, R. (2010). Diversity and Inclusion in Australian Schools.
 Oxford University Press, Australia
- Martin, K. (2008). The intersection of Aboriginal knowledges, Aboriginal literacies and new learning pedagogy for Aboriginal students. In Healy, A (Ed.) Multiliteracies and diversity in education: New pedagogies for expanding landscapes pp 59-81. Oxford University Press, Melbourne.
- Price, K (2012), Aboriginal and Torres Strait Islander Education: An Introduction for the Teaching Profession. Cambridge University Press

Recommended websites

NESA

http://syllabus.nesa.nsw.edu.au/science/

Science Teachers Association of NSW http://www.stansw.asn.au

8. ASSESSMENT

Assessment Task	Length	Weight	Student Learning Outcomes Assessed	Australian Professional Standards Assessed	National Priority Area Elaborations Assessed	Due Date
Task 1 Lesson Plan	c. 2000 words	40%	1-5	1.1.1, 1.2.1, 1.3.1, 2.1.1, 2.2.1, 2.3.1, 2.5.1, 2.6.1, 3.1.1, 3.3.1, 3.4.1, 3.5.1, 4.2.1, 4.4.1	A4, 7 C1, 3-5 D1, 3-5, 8-10 F4	Wednesday 23 rd March 2022 by 5pm
Task 2 Unit of Work	c. 3500 words	60%	1, 4-7	1.2.1, 1.3.1, 1.4.1, 1,5,1, 2.1.1, 2.2.1, 2.3.1, 2.4.1, 2.6.1, 3.1.1, 3.2.1, 3.3.1, 3.4.1, 3.5.1, 3.6.1, 6.3.1, 7.1.1	A2, 5 C6, 10, 12 D11-12, 18-19 E7 F5	Wednesday 27 th April 2022 by 5pm

Submission of assessments

Students are required to follow their lecturer's instructions when submitting their work for assessment. All assessment will be submitted online via Moodle by 5pm. Students are also required to keep all drafts, original data, and other evidence of the authenticity of the work for at least one year after examination. If an assessment is mislaid the student is responsible for providing a further copy. Please see the Student Policies and Procedures for information regarding submission, extensions, special consideration, late penalties, and hurdle requirements etc. https://education.arts.unsw.edu.au/students/courses/course-outlines/

Assessment Details

Assessment Task 1: Year 11 Lesson plan

Plan and design one 60-minute lesson for a Year 11 Chemistry or Biology class. The lesson plan must follow a standard SED format and be presented using the template provided.

Plan your lesson for a class in a comprehensive high school which would typically include EAL/D students, Indigenous students, and students with various religious and cultural backgrounds. Some students may have low levels of literacy. Differentiation strategies to cater for some students are therefore required. Appropriate differentiation strategies are scaffolding, group work and/or an alternative task or mode of presentation.

- 1. Write a rationale for your lesson plan. Your rationale should address the questions: What do I want the students to learn? Why is it important? What strategies will I use? What assessment for learning strategies will I use to monitor progress?
- 2. Prepare the lesson plan to demonstrate how you will use appropriate structure, activities, strategies, and formative assessment to develop understanding of the material.

Make sure you:

- choose an appropriate topic for the year group
- support your rationale using references indicating your professional reading
- choose appropriate outcomes and lesson content
- choose an appropriate context
- demonstrate knowledge of effective teaching and learning strategies
- use appropriate format and provide sufficient detail for an effective lesson plan
- include some explicit literacy/numeracy teaching which integrates with the lesson focus
- provide one activity in full (which may be ICT-based)
- express yourself in clear, standard Australian English.

Assessment Task 2: Unit of work, Year 11 Chemistry or Biology

Prepare an outline for a unit of work for a Year 11 class. If you prepared a Biology lesson plan for Assessment 1, the unit of Work should be for Chemistry, and vice versa. The unit of work should cover the first five lessons, which are 80 minutes each; however, you are not preparing full lesson plans.

You must write a rationale for the unit (600-800 words) in which you:

- provide a brief outline of the school and class context
- state precisely what you want the students to learn and why it is important
- describe and justify your choice of context to suit the needs and abilities of this class
- justify your teaching strategies by referring to readings, research and material presented in lectures and the Quality Teaching framework
- demonstrate how differentiation will support a diverse range of learners
- describe the prior knowledge students have to begin this unit and discuss how you would assess and build on this prior knowledge.

The unit outline should be in a standard format that will be explained and investigated during lectures and tutorials. You will receive a **template** for the unit outline which you must use.

Your unit of work must have an embedded context and employ a logically sequenced series of lesson outlines, utilising a **variety of teaching strategies**. There should be potential for student engagement with the material taught.

Include:

- syllabus content statements for each lesson
- a description of the activities in each lesson
- one full activity for formative assessment (not an essay)
- one ICT-based activity (not watching a video or PowerPoint presentation)
- one group-work task with a focus on literacy/numeracy (not a mind-map)
- one incursion/excursion/performance/practical activity
- outlines only for the other teaching materials required

The assessment task is to be converted to a PDF with the student name in the title of the file and submitted via Moodle.

NB. ALL OUTCOMES AND CONTENT STATEMENTS MUST BE WRITTEN AS FULL STATEMENTS, ACCOMPANIED BY THEIR IDENTIFYING NUMBER.

UNSW SCHOOL OF EDUCATION FEEDBACK SHEET EDST6927 CHEMISTRY/BIOLOGY METHOD 1

Student Name: Student No.:

Assessment Task 1: Lesson plan, Year 11

Lecturer:

Recommended:

/20

Grade:

SPECIFIC CRITERIA	(-) —		≻ (+)
Understanding of the question or issue and the key concepts involved			
Rationale for lesson plan addresses the questions:			
what do I want the students to learn?			
why is it important?			
what strategies will I use?			
 what assessment for learning strategies will I use to monitor progress? 			
 rationale supported using references indicating your professional reading 			
Depth of analysis and/or critique in response to the task			
appropriate topic choice for the year group			
 appropriate choice of outcomes and lesson content 			
appropriate choice of context			
 demonstrates knowledge of effective teaching and learning strategies 			
appropriate selection of student activities			
 depth of knowledge of the NSW syllabus documents and other relevant 			
curriculum documents			
links between syllabus outcomes and the chosen activities evident			
Familiarity with and relevance of professional and/or research literature used			
to support response			
reference specifically to material, research and ideas presented in			
Chemistry/Biology method lectures	\perp		
Structure and organisation of the response			
appropriateness of overall structure of response			
clarity and coherence of organisation; logical sequence			
use of appropriate format	\bot		
Presentation of response according to appropriate academic and linguistic			
conventions			
 clarity, consistency, and appropriateness of conventions for quoting, citing, 			
paraphrasing, attributing sources of information, and listing references (APA style)			
 clarity and appropriateness of sentence structure, vocabulary use, spelling, 			
punctuation, and word length			
GENERAL COMMENTS		·	1

NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualize and/or amend these specific criteria. The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.

Date:

Weighting:

40%

UNSW SCHOOL OF EDUCATION FEEDBACK SHEET EDST6927 CHEMISTRY/BIOLOGY METHOD 1

Student Name: Student No.:

Assessment Task 2: Unit of work, Year 11 Chemistry/Biology

SPECIFIC CRITERIA	(-) —)	> (+)
Understanding of the question or issue and the key concepts involved					
• understanding of the task, including both a rationale and a unit of work					
Depth of analysis and/or critique in response to the task					
 ability to plan and assess for effective learning by designing lesson sequences using knowledge of the NSW syllabus documents or other curriculum requirements of the Education Act, including a rational that includes: a brief outline of the school and class context a statement of what students should learn students learn and why it is important a description and justification of choice of context justification of teaching strategies by referring to readings, research and material presented in lectures and the Quality Teaching framework demonstration of how differentiation will support a diverse range of learners description of the prior knowledge students have to begin this unit and discussion of how this prior knowledge will be assessed and built on design of a unit outline which uses teaching strategies related to the needs and abilities of the class contains an embedded context 					
 employs a logically sequenced series of lesson outlines, utilising a variety of teaching strategies has potential for student engagement with the material taught contains the required lesson activities 					
Familiarity with and relevance of professional and/or research literature used to					
 support response reference specifically to material, research and ideas presented in method lectures and from the Professional Experience lectures. 					
Structure and organisation of the response					
 appropriateness of overall structure of response clarity and coherence of organization; logical sequence use of appropriate format 					
Presentation of response according to appropriate academic and linguistic					
conventions					
 contributions are complete and of a standard suitable for use with secondary school students clarity and appropriateness of sentence structure, vocabulary use, spelling, punctuation, and word length 					
GENERAL COMMENTS		I.	1	I	

Lecturer: Date:

Recommended: /20 Grade: Weighting: 60%

NB: The ticks in the various boxes are designed to provide feedback to students; they are not given equal weight in determining the recommended grade. Depending on the nature of the assessment task, lecturers may also contextualize and/or amend these specific criteria. The recommended grade is tentative only, subject to standardisation processes and approval by the School of Education Learning and Teaching Committee.