

Assessment One Tasks and Criteria

4.1 Lesson Planning Assessment

Note: the candidate must engage in lesson planning and review for all teaching sessions during the academic year. **For the assessment**, each candidate provides **four** completed lesson plans and reviews for a module(s) that they teach (two in semester 1 and a further two in semester 2). **You are required to record outputs from your four lesson plans on the Moodle/VLE CRN 51389.**

TEACHING SESSION PLAN	
Module: Biomechanics of soft tissues (Biomedical and Mechanical Engineering)	Level / Stage (6,7,8) 8 Year: 3rd
Title of session/ topic: Design inspired by nature	
Mark the type of session: Lecture <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Lab <input type="checkbox"/> Studio <input type="checkbox"/> Workshop <input type="checkbox"/>	
Module Outcome (What module outcome(s) is the class/session aligned to): Fatigue, Fracture Toughness, Design Class/Session Outcomes : Upon completion of this session, you should be able to: (Share with students e.g. Write on board /slide/ project image at beginning of lecture for students) <ul style="list-style-type: none">• Describe typical artificial engineering materials• Introduce the topic of biomimetics• Look at specific examples• Introduce insect cuticle material• Detail some experiments and their findings	

Select & Prioritise Your Content:

For the session, decide what material is used in class and what material the students should study independently and/or online. To do this, think about the material and its relative importance and prioritise and

	In class / live (online) Support Learning	Independent Learning (student completes)
Priority (need to know)	Physical examples of interesting materials (sea shell, bamboo, bleached coral) Lecture notes Powerpoint presentation Youtube video	YouTube videos and links to TED talks on biomimetics are uploaded onto the moodle page for the students to view in their own time
Supplementary (nice to know)	Engineering formulas and equations for stress, strain, fatigue, fracture toughness	Thinking about materials outside the normally used ones (metals, ceramics, polymers) – considering how to tackle problems based on solutions from nature

Material in quadrants 1 and 3 typically become the focus during classes. Quadrants 2 and 4 represent material students could study themselves and use the VLE/Moodle and online learning objects to support this learning.

Think about how you might incorporate *Technology Enhanced Learning Tools and Blended Online Learning Objects*, that will develop students learning and engagement with the module.

Time	Teacher Activity	Student Activity	Resource Used
0-5min	Explain to students what the lesson will entail – what the learning outcomes will be, what they will be able to do by the end of the session.	Listening	
5-20min	Introducing the topic of biomimetics – design inspired by nature. Use lecture slides and hand out examples of materials that have been mimicked successfully by engineers to solve various problems (mechanical and biomedical)	Listening to lecture, touching, feeling and passing around objects that I distribute Actively answering questions – what is this object, what is it made from, what properties does it have that are unusual / useful for engineers?	Abalone shells, bleached coral, bamboo,
20-40min	Take 4 specific examples of animal or plant that engineers have mimicked and used to solve the following problems Locust wing / leg = fatigue Abalone shell = fracture toughness Bamboo / tree branch = bending resistance Shark skin = design for drag reduction / antifouling	Taking notes, performing calculations	Powerpoint to present formulas and problems whiteboard to work through calculations and problems
40-45min	Present a youtube video to recap and expand on what has been covered	Listening / observing,	
45-50min	Encourage using padlet Assign task of taking 1 observation from nature before next lesson – 3 bullet point assignment – what is the object? What interesting property has it? What can we use it for?	Taking notes / using padlet	Padlet

Online Student Engagement Tools:

Lecture slides will be uploaded on line. These contain several youtube videos they can watch in their own time. Padlet to be used at end of lesson

Teacher Reflection:**What worked well?**

The first half of this lecture is very visual – lecture slides contain only pictures and the students are given objects to touch and feel related to these pictures. Asking them “what is this?” instead of telling them is a good way to encourage initial breaking of the barrier and starting active engagement with the material. The answer to “what is this” is obvious so students did not fear getting this wrong. This established class participation which continued throughout the lesson. It was done initially for the objects they could touch and hold, and later for different materials on screen.

As this lesson was peer-reviewed (see comments below), I was a little more self-conscious than usual, but hopefully this did not come across. I received a wealth of valuable feedback from my colleague on this lesson on what worked well – namely the visual nature of my slides, my questioning techniques with the class and also the incorporation of my own research experience into the lesson. In the future I will definitely take any opportunity to try to incorporate more of this into my lessons. The subject matter along with relevant engineering concepts and calculations are very easy for me to talk about and to draw concrete and interesting examples from to pique the students interest – even to use actual problems I faced during my time in research or working as a forensic engineer could engage the class moreso than examples I have been taking from books.

What did not work?

Passing objects around the class takes an awfully long time. Splitting the class into groups for the first half would be a better idea and would encourage peer-participation and feedback. If each group was given one object to analyse and discuss among themselves instead of looking at several objects and passing them on before being asked about them it would allow them to concentrate on one thing and also have a chance to listen to their peers talk about different objects.

Some of the students had not yet covered some of the topics I wished to address (namely fatigue of materials). Next time I could alter the timing of the lecture to make sure these topics were covered first, or would just briefly introduce the topic of fatigue first before tackling a fatigue problem.

The youtube video was too long – had to cut the end off but encouraged students to view themselves at home

To what extent did you address different domains of learning?

The first half of the lecture is used to address psychomotor and affective domains. Touching and feeling objects as well as discussing them with their neighbours and with the teacher was encouraged. These were very basic (unskilled) motor activities but better than just observing pictures on the screen. The encouragement of peer discussion and teacher interaction establishes an environment in the classroom where learning is active, more student led and more ownership of the material is given to the students.

What would I do differently next time?

I would introduce more learning activities from my “Student Centred Learning Strategies”. To begin, I would break the class into groups and give them one object each – get them to do a mind-map of this object – what is it made from, how would it break, what challenges does it face in the natural world (wind, predators, loading etc.), and what properties might be useful for engineers. This would be a much better way to tackle a large number of different objects and would actively engage students. They could present the mind-maps for 2 minutes before we continue onto the problem-based section of the lecture.