



# BIOL263

## Palaeontology: The History of Life

S2 Day 2018

*Dept of Biological Sciences*

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#### Disclaimer

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## General Information

Unit convenor and teaching staff

Unit Convenor

Glenn Brock

[glenn.brock@mq.edu.au](mailto:glenn.brock@mq.edu.au)

Contact via [glenn.brock@mq.edu.au](mailto:glenn.brock@mq.edu.au)

E8A322

Technical Officer

Josh Griffiths

[josh.griffiths@mq.edu.au](mailto:josh.griffiths@mq.edu.au)

Tutor

Thomas Claybourn

[thomas.claybourn@mq.edu.au](mailto:thomas.claybourn@mq.edu.au)

Caitlin Kordis

[caitlin.kordis@mq.edu.au](mailto:caitlin.kordis@mq.edu.au)

Credit points

3

Prerequisites

(15cp at 100 level or above) including ((BIOL114 and BIOL116) or (GEOS112 and GEOS126))

Corequisites

Co-badged status

Unit description

The aim of this unit is to provide students with an introduction to the history and evolution of life on Earth. In this unit, students will be exposed to important core concepts in palaeontology such as evolution and extinction, functional morphology and biostratigraphy, and will investigate the morphology and evolutionary significance of the most important invertebrate and vertebrate animals groups (such as trilobites and dinosaurs) and plants in the fossil record. Combined with the opportunity to work with real fossil material during practical classes, students will also learn how fossils are used in applied palaeontology to solve various biological, ecological and geological problems. This approach gives students the opportunity to develop a deep time perspective to many of the environmental issues and challenges facing the world today. A voluntary, one day excursion to the Hunter Valley is also available and will allow students to observe fossils in the field and to collect their own fossil material.

## 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:

1. Use fossils to interpret and reconstruct the history of life on Earth.
2. Identify the major morphological features of important invertebrate and vertebrate groups preserved in the fossil record.
3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
4. Use fossils to solve basic biological, ecological, environmental and geological problems.
5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.
6. Use both verbal and written communication techniques to present your own ideas, analyses and interpretations of scientific evidence presented in the primary scientific literature.

## General Assessment Information

Task	Weight	Due Date	Linked Learning Outcomes	Linked Graduate Capabilities	Brief Description
Online lab quizzes	30%	To be completed via the BIOL263 iLearn page – see schedule for due dates	1-5	1-5, 7-9	The online lab quizzes will be based on Lecture AND specific material covered during the laboratory sessions each week. Best 10 quiz results used for this task
Discussion Topic	15%	<b>Internals:</b> upload pdf to Turnit-in on <b>MON 20 Aug</b> before 23.59 pm <b>Externals:</b> upload pdf to Turnit-in on <b>FRI 24 Aug</b> before 23.59 pm	1, 3, 5	2-6, 8, 9	Provides an opportunity to delve into the primary literature and formulate your own supported opinions on a hotly debated topic in palaeontology. We will have a group discussion/debate and you will provide an 800 word evaluation on the Discussion Topic. Feedback will allow improvement in the Major Assignment

BIOL263: Major Assignment (2500 words)	25%	Week 8  Friday 5 <sup>th</sup> October [upload pdf to Turnit- in before 11.59 pm]	1, 3, 5	2-6, 8, 9	Students must choose and submit <b>ONE</b> Major Assignment from the two possible topics.
Final Exam	30%	TBA	1-4	1-3	A Final 2 hour Exam based on material covered in lectures and laboratory sessions.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">online lab quizzes</a>	30%	No	See Unit Schedule
<a href="#">Discussion topic</a>	15%	No	See Unit Schedule for details
<a href="#">Major Assignment</a>	25%	No	Fri 5 Oct to Turnit-in
<a href="#">Final Exam</a>	30%	No	TBA

### online lab quizzes

Due: **See Unit Schedule**

Weighting: **30%**

*Online Quizzes (30%).* Each laboratory session in BIOL263 will be assessed via an online, multiple choice quiz on the BIOL263 iLearn page. Quiz questions will cover information presented in lectures AND on activities completed during laboratory sessions. Students are strongly encouraged to attend all Lab sessions since approximately half of the quiz questions each week will be based on Labs. Each Quiz is marked out of 20 and you will have 30 minutes to answer all questions. You may only attempt each quiz once. Students who do not attempt a quiz during the time allocated blocks will receive a zero mark for that quiz. External students will normally have 2 weeks after OCS's to complete quizzes. Students need to contact Glenn or one of the Tutors as soon as possible if there is a problem with attending a Lab. The best 10 quiz results will count towards the final Quiz mark for the unit. Please refer to BIOL263 iLearn site for deadlines for Quizzes.

On successful completion you will be able to:

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 2. Identify the major morphological features of important invertebrate and vertebrate groups preserved in the fossil record.

- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
- 4. Use fossils to solve basic biological, ecological, environmental and geological problems.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.

## Discussion topic

Due: **See Unit Schedule for details**

Weighting: **15%**

*Discussion Topic (15%).* The Discussion Topic will provide you with the opportunity to read a series of primary scientific papers on a hotly debated topic in palaeontology. This will allow you to become familiar with the way scientists communicate their ideas and gives you the chance to formulate your own conclusions regarding the strengths and weaknesses of the data presented in the published papers.

An introduction to the Discussion Topic and the questions you need to address will be provided separately on the iLearn site. Copies of all the relevant papers for the Discussion Topic are available on the BIOL263 iLearn site. **You are required to submit a written response (800 words) to each of the questions asked and to provide an evaluation of all the pertinent evidence and data related to the Discussion Topic.** It is always a good idea to carefully read each of the core papers **several times** so that you can come to grips with the key evidence presented in each paper. **Your written response need to be written completely in your own words** (no quotes or paraphrasing) and should be word processed (hand written Discussion Topics will not be accepted) and properly referenced.

On successful completion you will be able to:

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.
- 6. Use both verbal and written communication techniques to present your own ideas, analyses and interpretations of scientific evidence presented in the primary scientific literature.

## Major Assignment

Due: **Fri 5 Oct to Turnit-in**

Weighting: **25%**

*Major Assignment (25%).* Each student is expected to choose and submit **ONE** Major

Assignment (max 2500 words) from the two possible topics (these are provided separately on the iLearn website for the unit).

Marks for the Major Assignment will be given for:

1. Scientific evaluation or how well you have supported your answers using **evidence** from the primary scientific literature.
2. Logical organisation, formatting, sentence structure and style / grammar / spelling.
3. Relevance, clarity and acknowledgement of all figures, graphs and tables. Figures **MUST** be used to support your views in the Major Assignment.
4. Complete reference list and the correct and comprehensive citation of all sources using the Harvard Referencing System.

Full details about the marking criteria are provided separately on the BIOL263 iLearn site.

Details on how to format and structure the Major Assignment can be found on the BIOL263 iLearn site: A few key points are listed here:

- The assignment should be **word processed** using a 12 pt font with **double spacing** throughout, and **should not exceed 2000 words** (this is approximately equivalent to 5-6 double spaced A4 pages for text in 12 pt font and 2.5 cm margins). Hand written assignments won't be accepted.
- Write the Assignment in the "third person" (see separate file "**writing in the third person**" on iLearn page for tips). Objectivity requires that the assignment you are writing should not be expressed as, "I think," or, "We believe," but substantiated by research, giving evidence from scholarly works you have read. So you would use phrases such as, "Research suggests that...", "Smith and Jones (2010) argue that..." "I" and "We" disappear from academic writing.
- The word limit of **2500 words** does not include supporting figures, graphs, tables or the reference list.
- An accurate **word count** should be included on the coversheet for the assignment.
- You **MUST** include figures, graphs and/or tables in your assignment. Figures are vital as supporting evidence for your arguments and point of view. Make sure all figures, graphs, tables etc are referred to in the text and are included at relevant places in the text – do not lump them all together at the end of the assignment.
- **Use only primary reference sources from scientific texts and journals.** Avoid using secondary (and usually dated) sources such as encyclopedias or Readers Digest type material. **Don't use Wikipedia** (an online reference encyclopedia) as a reference source. Although this site has improved in recent years, it still has plenty of factual errors. Since Wikipedia merely summarises conclusions and does not present evidence,

it is a classic example of a secondary source.

- Since only one Major Assignment is scheduled for BIOL263, you are required to research and prepare your work to a **high standard**. You will need to rigorously assess and evaluate the data/evidence presented in each paper and to frame your answer to the questions posed based on supporting evidence and data from the literature. I want **YOUR** critical evaluation/synthesis of the topic, not someone else's. **I re-iterate again, that the assignment MUST be written in your own words.** Do not copy and paste text from the core papers – this is plagiarism. Do not copy and paste text from the papers and change a few words – this is plagiarism! Do not reuse Figures without clearly citing the source.
- Don't fall into the trap of simply summarising the conclusions or interpretations of the authors of the core papers. Your job is to critically evaluate **the evidence** provided in support of the various interpretations. To do this properly, you will need to read widely and investigate the details of unfamiliar concepts and terminology.
- Previous experience has shown that students who leave starting their Major Assignment to a few days prior to submission usually get a correspondingly low mark.
- Make sure all information sources used are cited in the text in the appropriate manner.
- A full reference list in alphabetical order should be included at the end of the assignment. Only sources cited in the main text of the assignment should be included in the reference list. **You MUST use the Harvard Referencing Style when writing your assignment** (see separate handout entitled '*Harvard Referencing Style for Palaeontology Assignments at Macquarie University*' available on iLearn). This means that the use of footnotes or numbered reference citations (Oxford referencing style) **should be completely avoided.**

On successful completion you will be able to:

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.
- 6. Use both verbal and written communication techniques to present your own ideas, analyses and interpretations of scientific evidence presented in the primary scientific literature.

## Final Exam

Due: **TBA**

Weighting: **30%**

The Final Exam will potentially cover all material presented in lectures and covered in laboratory sessions. You will not be expected to memorize genus and species names for the exam, but you should know the correct order of periods in the Phanerozoic timescale. You are expected to be familiar with the morphology, function, evolutionary trends and applications of the fossil groups we examine during the unit. Detailed information regarding the format and structure of the Final Exam will be provided at a later date and posted on the BIOL263 iLearn site.

On successful completion you will be able to:

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 2. Identify the major morphological features of important invertebrate and vertebrate groups preserved in the fossil record.
- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
- 4. Use fossils to solve basic biological, ecological, environmental and geological problems.

## Delivery and Resources

Occupational health and safety. Due to OH&S regulations, all students **MUST** wear fully enclosed footwear (i.e. no thongs) at all times during laboratory sessions in E5A220. Students without proper footwear will be unable to enter the lab. Food and drink may not be consumed in the lab at any time either.

Textbook. There is no prescribed textbook for BIOL263, but one text is **highly recommended** since it embraces most of the topics to be covered. Unfortunately, like most textbooks, it is somewhat expensive (~\$90-100) and so purchase of the text is certainly not compulsory, but it would be a useful study tool. You may be able to pick up a cheaper second hand copy online. The text is:

**BENTON, M.J. & HARPER, D.A.T. (2009). *Introduction to Paleobiology and the fossil record*. Wiley-Blackwell, United Kingdom, 592 pp. ISBN 978-1-4051-8646-9.**



I have arranged for a limited number (30 copies) of Benton & Harper (2009) to be available in the Co-Op bookshop for purchase (on a first in, first served basis). Two copies of Benton & Harper (2009) are also available in the Library. A companion website for this text is available at: <http://www.blackwellpublishing.com/paleobiology/>. Suggested readings to supplement the information provided in the lectures and laboratory sessions are indicated in the Unit Schedule.

*Recommended reading.* There are a number of other useful textbooks in the Library (listed below) that you may find helpful as supplementary reading for BIOL263. These will be located in Special Reserve for the duration of the semester.

ADRAIN, J.M., EDGECOMBE, G.D. & LIEBERMAN., B.S. (eds) 2001. *Fossils, phylogeny, and form: an analytical approach*. Kluwer Academic, New York. **[QE719.8.F68]**

AUSICH, W.I. & LANE, N.G. 1999. *Life of the past*, 4<sup>th</sup> edn. Prentice Hall, New Jersey. **[QE711.2.L35]**

BENTON, M.E. (ed.) 1993. *The fossil record 2*. Chapman & Hall, London. **[QE723.P67]**

BLACK, R.M. 1988. *The elements of palaeontology*, 2<sup>nd</sup> edn. Cambridge University Press, Cambridge. **[QE711.2.B5]**

BOARDMAN, R.S., CHEETHAM, A.H. & ROWELL, A.J. 1987. *Fossil invertebrates*. Blackwell Scientific Press, Palo Alto. **[QE770.F67]**

CLACK, J.A. 2002. *Gaining ground: the origin and evolution of tetrapods*. Indiana University Press, Indiana. **[QE852.D5.C57]**

CLARKSON, E.W. 1986. *Invertebrate palaeontology and evolution*, 2<sup>nd</sup> edn. Allen & Unwin, London. **[QE770.C55/1986]**

CLARKSON, E.W. 1993. *Invertebrate palaeontology and evolution*, 3<sup>rd</sup> edn. Chapman & Hall, London. **[QE770.C56/1993]**

CLARKSON, E.W. 1998. *Invertebrate palaeontology and evolution*, 4<sup>th</sup> edn. Blackwell Science, Oxford. **[QE 770.C56/1998]**

COWEN, R. 1995. *History of life*, 2<sup>nd</sup> edn. Blackwell Scientific Publications, Boston. **[QE711.2.C68]**

COWEN, R. 2000. *History of life*, 3<sup>rd</sup> edn. Blackwell Scientific Publications Boston. **[QE711.2.C68]**

COWEN, R. 2005. *History of life*, 4<sup>th</sup> edn. Blackwell Scientific Publications, Boston. **[QE711.2.C68]**

DOYLE, P. 1996. *Understanding fossils: an introduction to invertebrate palaeontology*. Wiley, New York. **[QE770.D69]**

ELDREDGE, N. & ALCOSSER, M. 1991. *Fossils: the evolution and extinction of species*. H.N. Abrams, New York. **[QE711.2.E47]**

FOOTE, M. & MILLER, A.I. 2007. *Principles of paleontology*, 3<sup>rd</sup> edn. W.H. Freeman, New York. **[QE711.2.F66]**

FORTEY, R.A. 2002. *Fossils: the key to the past*. Natural History Museum Publication, London. **[QE711.3.F67]**

HALLAM, A. & WIGNALL, P.B. 1997. *Mass extinctions and their aftermath*. Oxford University Press, Oxford. **[QE721.2.E97.H35]**

JABLONSKI, D., ERWIN, D.H. & LIPPS, J.H. (eds) 1996. *Evolutionary paleobiology*. University of Chicago Press, Chicago. **[QE721.2.E85.E96]**

LANE, N.G. 1992. *Life of the past*. New York, Macmillan Publications. **[QE711.2.L35]**

LEHMANN, U. & HILLMER, G. 1983. *Fossil invertebrates*. Cambridge University Press, Cambridge. **[QE770.L4313]**

LIEBERMAN, B.S. 2000. *Paleobiogeography: using fossils to study global change, plate tectonics, and evolution*. Kluwer Academic, New York. **[QE721.2.P24.L54]**

LIPPS, J.H. & SIGNOR, P.W. (eds) 1992. *Origin and evolution of the Metazoa*. Plenum Press, New York. **[QE721.2.E85.O75]**

MURRAY, J.W. (ed.) 1985. *Atlas of invertebrate macrofossils*. Longmann Press, London. **[QE770.A87]**

KNOLL, A.H. 2003. *Life on a young planet: the first three billion years of evolution on earth*. Princeton University Press, New Jersey. **[QH325.K54 2003]**

RAUP, D.M. & STANLEY, S.M. 1978. *Principles of paleontology*. W.H. Freeman, San Francisco. **[QE711.2.R37]**

SCHOPF, J.W. 1999. *Cradle of life: the discovery of earth's earliest fossils*. Princeton University Press, New Jersey. **[QE719.S36]**

SMITH, A.B. 1994. *Systematics and the fossil record: documenting evolutionary patterns*. Blackwell Scientific Publications, Oxford. **[QE721.2.E85.S65]**

STANLEY S.M. 1989. *Earth and life through time*, 2<sup>nd</sup> edn. W.H. Freeman, New York. **[QE28.3.S73]**

STEARNS, C.W. & CARROLL, R.L. 1989. *Paleontology: the record of life*. Wiley, New York. **[QE711.2.S74]**

WARD, P.D. 1998. *Time machines: scientific explorations in deep time*. Copernicus, New York. **[QE711.2.W37/1998]**

## Unit Schedule

See BIOL263 for Unit Schedule

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central](https://staff.mq.edu.au/policy-central) (<https://staff.mq.edu.au/policy-central>)

[mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central](http://mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central)). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- [Academic Appeals Policy](#)
- [Academic Integrity Policy](#)
- [Academic Progression Policy](#)
- [Assessment Policy](#)
- [Fitness to Practice Procedure](#)
- [Grade Appeal Policy](#)
- [Complaint Management Procedure for Students and Members of the Public](#)
- [Special Consideration Policy](#) (**Note:** *The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.*)

Undergraduate students seeking more policy resources can visit the [Student Policy Gateway](http://students.mq.edu.au/support/study/student-policy-gateway) (<http://students.mq.edu.au/support/study/student-policy-gateway>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit [Policy Central](http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central) (<http://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/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/study/getting-started/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](http://ask.mq.edu.au).

### Workload

**Workload.** Since BIOL261 is a 3 cp unit, you are expected to spend ~9 hours per week (including face-to-face teaching time) working on this unit for the duration of the semester. Please note that Macquarie University defines a semester as being 15 weeks in duration – 13 weeks of face-to-face teaching, plus the two week mid-semester break.

**Lectures.** BIOL263 has 2 x 1 hour lectures per week: One Lecture is on each Thursday from **1.00 pm in E7A T4** and the second Lecture on each Friday from **12.00 (Midday) in E7A T4**. See the separate Unit Schedule on iLearn for the topics to be covered each week. Students who regularly attend lectures always perform better in Lab classes and in the Final Exam, so I strongly encourage you to attend as many Lectures as possible. Each weekly quiz will include questions directly based on information and concepts outlined in the lectures, so regular attendance at lectures will obviously help you successfully complete the quizzes. Formal lectures

will focus on a broad range of palaeontological concepts and topics including important 'core' topics as well as some exciting new avenues of palaeontological research (see Unit Schedule). Lectures recordings and slides will be available via iLearn.

**Weekly Laboratory sessions. Note: laboratory sessions begin in week 2!**

All Lab sessions are held in Building E5A room 220. Palaeontology is essentially a hands-on subject and each week's laboratory session will provide you with the opportunity to come into contact with a broad range of fossil groups that will reinforce the terminology and concepts outlined in the lectures. You are not expected to memorise genus and species names of particular fossils, but you are expected to become familiar with their morphology, function and application.

Lab sessions will range in duration from 2-3 hours (depending on Lab) and internal Students are expected attend 1 Lab each week. Labs are available either on Tuesday (9.00 am – 12.00 pm) OR Tuesday (2.00 pm -15.00 pm) each week. Please try to stick to your allocated Lab session, but if you need to change please inform Glenn or one of the Tutors. Internal students who miss a lab may be able to "make-up" the Lab with the External students. External students, who might have clashes with other OC sessions can complete Labs with Internals students, if convenient. For serious clashes, please contact Glenn as soon as possible.

Introductory slides for each laboratory session will be available on the BIOL263 iLearn page. Worksheets to be completed during laboratory sessions will also be available on iLearn. Apart from Week 1, hard copies of work sheets will not be provided. **Students will need to download and printout hard copies of worksheets to each Lab or download and fill-in them in online via the BIOL263 iLearn site.** The worksheets contain relevant background information and specific tasks that need to be completed to ensure online lab quizzes can be completed satisfactorily.

On-campus sessions. Externals students will complete Lab sessions in two blocks. For logistic reasons some Labs may have to alter slightly to conform with an intensive block schedule when labs are held back to back over one or two days.

On campus session I is scheduled for Saturday 27 August [Labs 1-3, 6]

On-campus session II is scheduled for Thursday 29 and Friday 30 September. (Note OCSII is in the mid-semester break) [Labs 4-5,7-11]

***Submission Dates for Assessment Tasks***

**Discussion Topic and Major Assignment**

Turnitin. In order to tackle the issue of student plagiarism, Macquarie University uses an online anti-plagiarism detection tool called *Turnitin*. This program works by comparing each student's work with the work of other students and material found online. More information on this anti-plagiarism software is available at: .

As part of the submission requirements for the **Discussion Topic** and **Major Assignment**, all BIOL263 students must also submit their work to *Turnitin*. **Students who do not submit their**

**assignments to Turnitin will not have their work marked until they do so and may have marks deducted (5%) each day after the due date.** You MUST upload your work to Turnitin through the BIOL263 iLearn website.

Discussion Topic (15%). For Internal students, the group discussion/debate for the Discussion Topic will take place in the first 45 mins of the laboratory session in **WEEK 4** (see Schedule). External students will complete the group discussion/debate during OCS1. All students are expected to participate in the group discussion/debate. The 800 word written response to the questions asked for the Discussion Topic must be **submitted as a PDF file the day BEFORE** the scheduled Discussion Topic. Submission dates below and in Unit Schedule.

#### SUBMISSION DATES: DISCUSSION TOPIC

**Internal Students** MUST submit a pdf version to Turnit-in on Monday 22nd August before 11.59 pm.

**External Students** MUST submit a pdf version to Turnit-in on Friday 26th August before 11.59 pm

Major assignment (25%). The Major Assignment must be submitted as a pdf file to Turnit-in on (or before) **FRIDAY 7th OCTOBER** before 11.59 pm. This gives you nearly 10 weeks to produce a high quality assignment. Based on past experience, those students who start research and reading early and produce a number of drafts of the major assignment do much better than those who leave it late to read relevant papers and write a logically organised and tight worded assignment that follows the instructions. My recommendation is to start reading and mapping out your first draft by Week 3 and then use feedback from the Discussion Topic to help complete your Major Assignment.

Lab Quizzes (30%). You are expected to complete all laboratory sessions in the time allotted each week. For internal schedules, the online quiz will be opened at **6.00 pm on Tuesday each week** and will remain open for 3 week blocks. Details on closing dates for quizzes will be available on the BIOL263 iLearn website. It will not be possible for internal students to complete the external quiz sessions (and vice versa).

#### **Extensions and penalties**

If you require an extension to complete any work for this unit please discuss this with Glenn as soon as possible. You must formally apply for a disruption of studies if there is some reason you cannot submit by the due dates. Unless accompanied by a doctor's certificate (or my direct approval) all written tasks will be penalised at the rate of 5% per day.

#### **Returning assessment tasks**

Your mark (out of 20) for each Quiz is provided immediately after you complete each online quiz. Answers for the quizzes will be released over three dates (see Schedule for details), after all students have completed the quiz. The Discussion Topic is aimed to be returned to students ~2 weeks after submission and the Major Assignment within 3 weeks of submission.

#### **VOLUNTARY FIELD EXCURSION**

Field Excursion. A voluntary one day field excursion to examine fossiliferous Permian sequences

in the Lower Hunter Valley will be held on SATURDAY 15th OCTOBER. The aim of the excursion is to provide each student with the opportunity to examine and collect fossils in the field, to explore how fossils are used to reconstruct palaeoenvironments and provide relative dates on sedimentary successions. Students will also have the opportunity to collect their own fossil material. More details will be provided at a later date.

## 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](http://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](http://ask.mq.edu.au)

## IT Help

For help with University computer systems and technology, visit [http://www.mq.edu.au/about\\_us/offices\\_and\\_units/information\\_technology/help/](http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/).

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

- 4. Use fossils to solve basic biological, ecological, environmental and geological



problems.

- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.

## **Assessment tasks**

- online lab quizzes
- Discussion topic
- Major Assignment

## **Capable of Professional and Personal Judgement and Initiative**

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

## **Assessment tasks**

- online lab quizzes
- Discussion topic
- Major Assignment
- Final Exam

## **Commitment to Continuous Learning**

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

## **Learning outcome**

- 1. Use fossils to interpret and reconstruct the history of life on Earth.

## **Assessment tasks**

- online lab quizzes
- Discussion topic
- Major Assignment

## 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

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 2. Identify the major morphological features of important invertebrate and vertebrate groups preserved in the fossil record.
- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.
- 4. Use fossils to solve basic biological, ecological, environmental and geological problems.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.

### Assessment tasks

- online lab quizzes
- Final Exam

## 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

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 2. Identify the major morphological features of important invertebrate and vertebrate groups preserved in the fossil record.
- 3. Describe the significant evolutionary trends displayed by important animal and plant groups preserved in the fossil record.



- 4. Use fossils to solve basic biological, ecological, environmental and geological problems.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.

## **Assessment tasks**

- online lab quizzes
- Discussion topic
- Major Assignment
- Final Exam

## **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**

- 1. Use fossils to interpret and reconstruct the history of life on Earth.
- 4. Use fossils to solve basic biological, ecological, environmental and geological problems.
- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.

## **Assessment tasks**

- online lab quizzes
- Discussion topic
- Major Assignment
- Final Exam

## **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

- 5. Undertake basic studies and interpretations of biostratigraphy, functional morphology, palaeoenvironmental reconstruction and palaeoclimatic interpretation.
- 6. Use both verbal and written communication techniques to present your own ideas, analyses and interpretations of scientific evidence presented in the primary scientific literature.

## Assessment tasks

- online lab quizzes
- Discussion topic
- Major Assignment
- Final Exam

## 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:

## Assessment tasks

- online lab quizzes
- Major Assignment

## Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

## Assessment task

- Discussion topic

## Changes since First Published

Date	Description
27/07/2018	-