



# BIOX2310

## Diversity of Life

Session 2, Infrequent attendance, North Ryde 2021

*Archive (Pre-2022) - Department of Biological Sciences*

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#### **Disclaimer**

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#### **Session 2 Learning and Teaching Update**

The decision has been made to conduct study online for the remainder of Session 2 for all units WITHOUT mandatory on-campus learning activities. Exams for Session 2 will also be online where possible to do so.

This is due to the extension of the lockdown orders and to provide certainty around arrangements for the remainder of Session 2. We hope to return to campus beyond Session 2 as soon as it is safe and appropriate to do so.

Some classes/teaching activities cannot be moved online and must be taught on campus. You should already know if you are in one of these classes/teaching activities and your unit convenor will provide you with more information via iLearn. If you want to confirm, see the list of [units with mandatory on-campus classes/teaching activities](#).

Visit the [MQ COVID-19 information page](#) for more detail.

## General Information

Unit convenor and teaching staff

Convenor

John Alroy

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Contact via [BIOL2310@mq.edu.au](mailto:BIOL2310@mq.edu.au), ph: 9850 8185

14 Eastern Road, Room 376

Credit points

10

Prerequisites

50cp at 1000 level or above including (BIOL1310 or BIOL114)

Corequisites

Co-badged status

Unit description

This unit explores the biological diversity of plants and animals. Relationships between structure and function are emphasised. The unit also discusses how organisms have adapted to specific environments. There is a strong emphasis on evolutionary processes and how these have generated biological diversity. A comparative approach is taken, with adaptation discussed in the context of evolutionary trees and the fossil record. The unit is suitable for students interested in organismal biology, science education, and research.

## 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:

**ULO1:** Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms

**ULO3:** Identify the key anatomical traits used to define major groups

**ULO4:** Explain how key anatomical traits are linked to the success of different organisms in solving problems posed by diverse environments

**ULO5:** Critically evaluate the primary scientific literature

**ULO2:** Give examples of individual organisms that belong to the major animal and plant groups

## General Assessment Information

### *Weekly Assessment (25%)*

Your progress will be tracked on a weekly basis by means of a 20-question online quiz. Content from the discussions and pracs will be covered. To accommodate infrequent attendance students, quizzes will only reference material in the practicals during the second half of the term (after the break). Because the unit is rich on information, if you do not study on a regular basis your grades will be impacted.

The slides for each discussion in this unit are based on primary scientific literature. You will be expected to learn fundamental concepts in organismal biology such as the intellectual basis of phylogenetics and taxonomy, the causes and consequences of adaptive radiations and mass extinctions, and the functional roles of anatomical structures. You will also learn a considerable amount of specific detail concerning the names, relationships, evolutionary histories, and key anatomical adaptations of major taxonomic groups.

Practical work constitutes a large proportion of the unit, and the weekly three-hour prac sessions are intended to lead on from the group discussion where possible (although some pracs relate to material covered the next week). Students are expected to attend every single prac, and you must attend at least six pracs to pass the unit. If you attend fewer, you will automatically be failed.

Note that there are no pracs for *weekday* students during weeks 1, 7, 12, and 13.

### *Phylogenetic Illustration (5%)*

The Phylogenetic Illustration involves preparing a slideshow document that depicts the relationships of one family of plants, invertebrates, or vertebrates (a family is a group of genera, and a genus is a group of species). You must select a family from one of several lists that will be provided. The document should be prepared in PowerPoint, Keynote, or another presentation application but submitted in PDF format. The presentation should start with a title slide; a slide giving the full scientific reference for the phylogeny; a slide with a sentence identifying and explaining a physical characteristic unique to the family (a synapomorphy); and an illustration of the phylogeny itself. Following this, there should be at least 15 slides each showing a photo of a species, its scientific name, its English name or country or origin, and a URL linking to the source of the image. At least 10 different websites should be used to provide the images.

A Turnitin link for the assignment will be made available on iLearn early during the semester. Copies may not be submitted directly to the staff. An announcement will be made once the detailed instructions have been released, including the list of families that can be chosen.

Marks will be allotted for the title and reference slides (10%), presentation and selection of the phylogeny (10%), explanation of the synapomorphy (10%), species images and names (60%), and URLs (10%). Points will be deducted if the main source is not a primary scientific research

paper, meaning that literature reviews and websites per se cannot be used to obtain a phylogeny.

There will be a 10% per day penalty for handing the assignment in late: for example, if your mark would have been 80% but it was submitted five days late, the final mark will be  $80\% \times 50\% = 40\%$ .

### *Literature Review (20%)*

The 1500 word Literature Review will provide an opportunity to read and evaluate recently published scientific papers that will be assigned to you. You will have to first summarise them and then discuss their strengths and weaknesses in a short and succinct manner. This task will allow you to become familiar with the primary way scientists communicate their ideas.

As with all the assignments, a Turnitin link for the assignment will be made available on iLearn. Hard copies may not be submitted. The announcement with detailed instructions will include the list of papers to be analysed.

The assignment will begin by presenting a 225 to 275 word abstract of each paper. Each abstract should be preceded by a full reference to the paper, giving all the authors, the publication year, paper title, journal title, volume number, and page numbers. The structure of each abstract should follow the guidelines used by *Nature* magazine, which can be viewed on the iLearn site. The only differences are that you must stick to the 225 to 275 word limit and you must refer to "the authors" and "they" instead of "we".

After the abstracts you will present a 500 word analysis of all the papers together, identifying common themes, explaining conflicts, and weighing the pros and cons of the different data sets, methods, results, and interpretations. Finally, you will conclude with a statement of your own view of the facts and provide directions for future research. Brief subheadings should be provided throughout the assignment.

The abstracts and everything else in the assignment must be entirely in your own words. Any copied words, no matter how few, must be placed in quotation marks. If you copy anything without attribution or without using quotation marks you will not receive credit for the relevant parts of the assignment. If you have copied without attribution, then depending on the severity of the case you may be reported to the Faculty Student Administration Manager, in accord with the Academic Honesty Procedure (see the *Policies and procedures* section).

You may want to consult the short, simple volume by W. Strunk and E.B. White called *The Elements of Style*.

Marks will be allotted for the following:

- Quality of the abstracts (20%): Adherence to the abstract word limit, use of the required structure, organisation and coherence of the text, and factual correctness. You must use your own words.
- Scientific evaluation (30%): Organisation and coherence of the text, factual correctness, in-depth analysis of the citations, and clarity and justification of the overall assessment. You must

present your own arguments in your own words and they must be grounded in the references.

- Adherence to the overall 1500 word limit (10%): Marks will be deducted for going either under or over the limit by 10%, meaning below 1350 words or above 1650 words.
- Presentation (30%): Spelling, grammar, conciseness, and sensible use of subheadings. Use 12 point font and double space the text.
- References (10%): Matching of citations to the text and the formatting and completeness of the references. You must use the Harvard Referencing Style. Numbering of references in the text and use of footnotes is not allowed.

As with the other assignments, there will be a 10% per-day penalty for late submission.

### *Practical Report (15%)*

The 1000 word Practical Report will be based on data collected during the Skull Allometry exercise during Week 11 (weekday attendees) or the second On Campus Session (infrequent attendees). The report will be due at the end of Week 13.

The report will be in the format of a real-world scientific research journal article, except that references are not required. As with the Literature Review, further details will be announced via iLearn during the semester and a Turnitin link will be provided (no hard copies).

The report will focus on two issues: how shape changes with size (allometry), and how body mass can be predicted by skull measurements. Importantly, the Report will include data on additional species not measured in the Skull Allometry practical. These data will be extracted by you from primary literature sources, and the text will discuss how well the equations developed in the prac predicted the body mass of the newly included species.

Marks will be allotted for scientific evaluation (50%), adherence to the word limit (10%), and presentation (30%), as discussed in the preceding section. The assignment must also include a graph on the last page showing a scatter plot with a fitted regression line, accompanied by an accurate and informative caption (10%).

The scientific evaluation marks will consider whether you included enough details regarding data collection and data analysis procedures to allow replicating your analysis. The presentation marks will additionally assess the use of proper, standardised subheadings (Introduction, Data, Methods, Results, Discussion, and References if they are included). An abstract should not be included.

The same lateness penalties discussed in the preceding sections apply to this assignment.

### *Final Exam (35%)*

The highly challenging Final Exam will cover all the major concepts introduced in the unit. It will include some combination of multiple choice questions, short answer questions, and long answer questions. Details will be given during the semester.

Importantly, the Final Exam will focus on material explained in the Discussions. This material is drawn from primary scientific literature, so studying the Discussion recordings and PDFs is essential. A study guide will be provided to help with preparation, and the last Discussion of the semester will give detailed guidance about major topics to be addressed in the Final Exam.

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Weekly Assessment</a>	25%	No	Weekly
<a href="#">Phylogenetic Illustration</a>	5%	No	13/08/21
<a href="#">Literature Review</a>	20%	No	10/09/21
<a href="#">Practical Report</a>	20%	No	05/11/21
<a href="#">Final Examination</a>	30%	No	Examination period

### Weekly Assessment

Assessment Type <sup>1</sup>: Quiz/Test

Indicative Time on Task <sup>2</sup>: 24 hours

Due: **Weekly**

Weighting: **25%**

Undertake a weekly quiz

On successful completion you will be able to:

- Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- Identify the key anatomical traits used to define major groups
- Explain how key anatomical traits are linked to the success of different organisms in solving problems posed by diverse environments
- Give examples of individual organisms that belong to the major animal and plant groups

### Phylogenetic Illustration

Assessment Type <sup>1</sup>: Media presentation

Indicative Time on Task <sup>2</sup>: 5 hours

Due: **13/08/21**

Weighting: **5%**

Develop a slide show including a phylogeny and images of species

On successful completion you will be able to:

- Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- Give examples of individual organisms that belong to the major animal and plant groups

## Literature Review

Assessment Type <sup>1</sup>: Essay

Indicative Time on Task <sup>2</sup>: 19 hours

Due: **10/09/21**

Weighting: **20%**

Present a summary and synthesis of multiple scientific papers

On successful completion you will be able to:

- Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- Identify the key anatomical traits used to define major groups
- Explain how key anatomical traits are linked to the success of different organisms in solving problems posed by diverse environments
- Critically evaluate the primary scientific literature
- Give examples of individual organisms that belong to the major animal and plant groups

## Practical Report

Assessment Type <sup>1</sup>: Lab report

Indicative Time on Task <sup>2</sup>: 19 hours

Due: **05/11/21**

Weighting: **20%**

Write a report on one of the practical exercises

On successful completion you will be able to:

- Critically evaluate the primary scientific literature
- Give examples of individual organisms that belong to the major animal and plant groups

## Final Examination

Assessment Type <sup>1</sup>: Examination

Indicative Time on Task <sup>2</sup>: 30 hours

Due: **Examination period**

Weighting: **30%**

A final invigilated exam will be held during the formal examination period

On successful completion you will be able to:

- Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- Identify the key anatomical traits used to define major groups
- Explain how key anatomical traits are linked to the success of different organisms in solving problems posed by diverse environments
- Give examples of individual organisms that belong to the major animal and plant groups

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<sup>1</sup> If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the [Learning Skills Unit](#) for academic skills support.

<sup>2</sup> Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

## Delivery and Resources

### *Workload*

There are nine pracs, two Discussions every week, and a quiz related to the Discussions and pracs every week, including Week 13. Therefore, you are expected to work on this unit every single week for the duration of the semester.

### *Discussions*

There will be two one-hour, online Discussions of the learning materials each week. They will be structured as combined lectures and tutorials, and will focus on the PDFs to be found on the iLearn site. The first will be held every Tuesday at 1:00 PM. The second will be held every



Wednesday at 3:00 PM. They will be recorded live and posted on Echo360 (accessed via the BIOL2310 iLearn site). All students taking any offering of this unit are strongly advised to attend the Discussions.

The weekly quizzes will focus on the same PDF material, in addition to material learned in the pracs. In other words, many of the questions are based on material only presented and explained in the Discussions. Therefore, if you do not attend or view them you may receive poor grades on the quizzes.

See the Unit Schedule for the topics to be covered each week. For the following reasons, it is in your best interests to attend:

- Conversations are easier to understand if you can see the instructor.
- Attending gives you an opportunity to ask questions.
- You need to prepare every week anyway because of the quizzes, and you might as well not put it off.
- Students who attend Discussions regularly tend to perform better than those students who attend them infrequently.
- Instructors very much appreciate interacting with you personally.

#### *Weekly practical laboratory sessions*

Each *weekday* student is expected to attend one three-hour prac session during each of nine weeks. Sessions will be held in 4 Wallys Walk – 110 Science Lab, and they will run from 10:00 AM to 1:00 PM and from 2:00 PM to 5:00 PM on Thursday and Friday. You must attend at least six pracs to pass the unit.

Each *infrequent attendance* student is expected to attend the two on-campus sessions, which cover nine pracs. The first is on 21 and 22 August (a Saturday and Sunday) and will be in 4 Wallys Walk – 102 Science Lab. The second is on 23, 24, and 25 September (a Thursday, Friday, and Saturday) and will also be in 4 Wallys Walk – 102 Science Lab. Sessions will run from 9:00 AM to 3:00 PM, except on the last day of the second session, which will run until noon. You must attend at least six of the nine pracs to pass the unit.

#### *iLearn*

PDFs and recordings of the Discussions will be available on iLearn (<https://ilearn.mq.edu.au>), which is the primary method of communication for this unit. The site is also used for making announcements, answering questions, and uploading assignments via Turnitin links.

#### *Materials*

It is recommended that you maintain a notebook or bring a laptop to document your work during the practical sessions. A dissecting kit is not required.

#### *Occupational health and safety*

Due to OH&S regulations, all students must wear fully enclosed footwear – so no thongs – at all times during practical laboratory sessions. Students without proper footwear will not be allowed

to enter the lab. Food and drink may not be consumed in the lab at any time either.

*Recommended reading*

The material presented here is more current, detailed, and directly tied to primary scientific literature than what you would find in any undergraduate textbook. Therefore, you do not need to purchase one. Instead, you are encouraged to consult primary literature referenced in the PDFs that accompany the Discussions.

## Unit Schedule

Discussions			
Discussion 1	Introduction	Week 1	27 July
Discussion 2	Phylogenetics	Week 1	28 July
Discussion 3	The History of Life	Week 2	3 August
Discussion 4	Biodiversity and Extinction	Week 2	4 August
Discussion 5	Microbes	Week 3	10 August
Discussion 6	Land Plants	Week 3	11 August
Discussion 7	Flowering Plants	Week 4	17 August
Discussion 8	Plant Diversity	Week 4	18 August
Discussion 9	Major Plant Families	Week 5	24 August
Discussion 10	Plant Reproduction	Week 5	25 August
Discussion 11	Plant Functional Traits and Ecological Strategies	Week 6	31 August
Discussion 12	Evolution of the Australian Flora	Week 6	1 September
Discussion 13	Plant Diversification and Speciation	Week 7	7 September
Discussion 14	Sponges and Cnidarians	Week 7	8 September
Discussion 15	Minor Protostomes	Week 8	28 September
Discussion 16	Lophophorates and Molluscs	Week 8	29 September
Discussion 17	Marine Arthropods	Week 9	5 October
Discussion 18	Terrestrial Arthropods	Week 9	6 October
Discussion 19	Minor Deuterostomes	Week 10	12 October
Discussion 20	Fishes	Week 10	13 October
Discussion 21	Primitive Tetrapods	Week 11	19 October

Discussion 22	Reptiles Part 1	Week 11	20 October
Discussion 23	Reptiles Part 2	Week 12	26 October
Discussion 24	Mammals	Week 12	27 October
Discussion 25	Human Evolution	Week 13	2 November
Discussion 26	Unit Summary	Week 13	3 November

Weekday Attendance Pracs		
Prac 1	The History of Life	Week 2
Prac 2	Leaf Morphology	Week 3
Prac 3	Floral Allocation	Week 4
Prac 4	Plant Functional Traits and Ecological Strategies	Week 5
Prac 5	Invertebrate Body Plans	Week 6
Prac 6	Arthropod Diversity	Week 8
Prac 7	Butterflies	Week 9
Prac 8	Birds	Week 10
Prac 9	Skull Allometry	Week 11

Infrequent Attendance Pracs		
Prac 1	The History of Life	21 August
Prac 2	Leaf Morphology	21 August
Prac 3	Floral Allocation	22 August
Prac 4	Plant Functional Traits and Ecological Strategies	22 August
Prac 5	Invertebrate Body Plans	23 September
Prac 6	Arthropod Diversity	23 September
Prac 7	Butterflies	24 September
Prac 8	Birds	24 September
Prac 9	Skull Allometry	25 September

## Policies and Procedures

Macquarie University policies and procedures are accessible from [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au). 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](#)

Students seeking more policy resources can visit [Student Policies \(https://students.mq.edu.au/support/study/policies\)](https://students.mq.edu.au/support/study/policies). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

To find other policies relating to Teaching and Learning, visit [Policy Central \(https://policies.mq.edu.au\)](https://policies.mq.edu.au) and use the [search tool](#).

## Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: <https://students.mq.edu.au/admin/other-resources/student-conduct>

## Results

Results published on platform other than [eStudent](#), (eg. iLearn, Coursera etc.) 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) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## 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 help you improve your marks and take control of your study.

- [Getting help with your assignment](#)
- [Workshops](#)

- [StudyWise](#)
- [Academic Integrity Module](#)

The Library provides online and face to face support to help you find and use relevant information resources.

- [Subject and Research Guides](#)
- [Ask a Librarian](#)

## Student Enquiry Service

For all student enquiries, visit Student Connect at [ask.mq.edu.au](http://ask.mq.edu.au)

If you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Equity 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.

## 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.

## Changes from Previous Offering

The 2020 offering included several online pracs. The 2021 offering will include in-person pracs only. There have been revisions to the Discussions and other educational materials.

## Changes since First Published

Date	Description
13/08/2021	Added BIOL2310@mq.edu.au mailbox as contact, as directed by Sharyon O'Donnell.