



# BIOX2310

## Diversity of Life

Session 2, In person-scheduled-infrequent, North Ryde 2022

*School of Natural Sciences*

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#### **Disclaimer**

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## General Information

### Unit convenor and teaching staff

Convenor

John Alroy

[john.alroy@mq.edu.au](mailto:john.alroy@mq.edu.au)

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

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

**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

## 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 standard per-day penalties for handing the assignment in late.

### *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". Also, be sure to include numerical figures, such as counts of evaluated species and characters, in the abstract itself.

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. This section should not heavily repeat information already given. 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 standard per-day penalty for late submission.

### *Practical Report (20%)*

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 section apply to this assignment.

### *Final Exam (30%)*

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.

### *Late Assessment Submission Penalty*

From 1 July 2022, Students enrolled in Session based units with written assessments will have the following university standard late penalty applied. Please see <https://students.mq.edu.au/>

study/assessment-exams/assessments for more information.

Unless a Special Consideration request has been submitted and approved, a 5% penalty (of the total possible mark) will be applied each day a written assessment is not submitted, up until the 7th day (including weekends). After the 7th day, a grade of '0' will be awarded even if the assessment is submitted. Submission time for all written assessments is set at 11:55 pm. A 1-hour grace period is provided to students who experience a technical concern.

For any late submission of time-sensitive tasks, such as scheduled tests/exams, performance assessments/presentations, and/or scheduled practical assessments/labs, students need to submit an application for Special Consideration. Assessments where Late Submissions will be accepted In this unit, late submissions will accepted as follows:

Phylogenetic Illustration – YES, Standard Late Penalty applies

Literature Review – YES, Standard Late Penalty applies

Practical Report – YES, Standard Late Penalty applies

## Assessment Tasks

Name	Weighting	Hurdle	Due
<a href="#">Weekly Assessment</a>	25%	No	Weekly
<a href="#">Phylogenetic Illustration</a>	5%	No	12/08/22
<a href="#">Literature Review</a>	20%	No	09/09/22
<a href="#">Practical Report</a>	20%	No	04/11/22
<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

- Give examples of individual organisms that belong to the major animal and plant groups
- 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

## Phylogenetic Illustration

Assessment Type **1**: Media presentation

Indicative Time on Task **2**: 5 hours

Due: **12/08/22**

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 **1**: Essay

Indicative Time on Task **2**: 19 hours

Due: **09/09/22**

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
- Give examples of individual organisms that belong to the major animal and plant groups
- 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

## Practical Report

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

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

Due: **04/11/22**

Weighting: **20%**

Write a report on one of the practical exercises

On successful completion you will be able to:

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

## 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
- Give examples of individual organisms that belong to the major animal and plant groups
- 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

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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 [Writing Centre](#) 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*

BIOX2310 are encouraged to attend the in-person Discussions if this is feasible. Alternatively, they may view Echo360 recordings of the Discussions (accessed via the BIOL2310 iLearn site).

There will be two one-hour, in-person 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 Monday at 11:00 AM. The second will be held every Tuesday at 11:00 AM. Again, all students taking any offering of Diversity of Life 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 iLearn page for the topics to be covered each week. For the following reasons, it is in your best interests to attend if this is possible:

- 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.

### *Practical laboratory sessions*

Online materials for the practical exercises are to be found on the iLearn page in the appropriate weekly sections. Students are encouraged not to attempt the practicals before the specific weeks that are listed because relevant information is provided during the preceding Discussions. It is very important not to put off completing the pracs because some of the quiz questions focus on the content of the pracs. Students may contact the convenor ([john.alroy@mq.edu.au](mailto:john.alroy@mq.edu.au)) or tutors to arrange online tutorial sessions in order to get help with the materials.

Students are also welcome to attend on-campus practical sessions of BIOL2310 if they choose. Either weekday or infrequent attendance practicals may be attended.

Each *weekday* student is expected to attend one three-hour prac session during each of nine weeks. Sessions will be held in 14 Eastern Road - 120 Science Lab and 5 Wallys Walk – 428 Glasshouse, and they will run from Tuesday afternoon starting at 10:AM (science lab), Wednesday morning starting at 2:00 PM (science lab), and Friday morning and afternoon starting respectively at 10:AM and 2:00 PM (both in the glasshouse). 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 the same nine pracs. The first is on 20 and 21 August (a Saturday and Sunday) and will be in 4 Wallys Walk – 102 Science Lab. The second is on 12, 13, and 14 September (a Monday, Tuesday, and Wednesday) and will also be in 4 Wallys Walk – 102 Science Lab. Sessions will run from 9:00 AM to 5:00 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**

Topics of the discussions and complete PDFs of the slides are to be found on the iLearn page in the appropriate weekly sections. The discussions will start with introductions to unit and to phylogenetics during Week 1. The history of life on Earth and biodiversity and extinction will be covered during Week 2. Microbes (one discussion) and plants (eight discussions) will be covered from weeks 3 through 7 (during the first discussion of that week). Invertebrates will be covered during the second discussion of Week 7 and the following five discussions through the first one of Week 10. The next six discussions are on vertebrates, and the final one during Week 13 is a unit summary intended to help students prepare for the final.

Practicals will be delivered via online materials on the iLearn page during weeks 2, 3, 4, 5, 6, 8, 9, 10, and 11, so there will be no pracs during weeks 1, 7, 12, and 13. Topics for the pracs are

given on the iLearn page in the weekly sections. Students are welcome to attend weekly and/or infrequent practical sessions on campus if this is feasible.

## 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](#)
- [Assessment Procedure](#)
- [Complaints Resolution 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](https://ask.mq.edu.au) or if you are a Global MBA student contact [globalmba.support@mq.edu.au](mailto:globalmba.support@mq.edu.au)

## Academic Integrity

At Macquarie, we believe [academic integrity](#) – honesty, respect, trust, responsibility, fairness and courage – is at the core of learning, teaching and research. We recognise that meeting the expectations required to complete your assessments can be challenging. So, we offer you a range of resources and services to help you reach your potential, including free [online writing and maths support](#), [academic skills development](#) and [wellbeing consultations](#).

## Student Support

Macquarie University provides a range of support services for students. For details, visit <http://student.mq.edu.au>

[dents.mq.edu.au/support/](https://dents.mq.edu.au/support/)

## The Writing Centre

The [Writing Centre](#) provides resources to develop your English language proficiency, academic writing, and communication skills.

- [Workshops](#)
- [Chat with a WriteWISE peer writing leader](#)
- [Access StudyWISE](#)
- [Upload an assignment to Studiosity](#)
- [Complete the 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 Services and Support

Macquarie University offers a range of [Student Support Services](#) including:

- [IT Support](#)
- [Accessibility and disability support](#) with study
- Mental health [support](#)
- [Safety support](#) to respond to bullying, harassment, sexual harassment and sexual assault
- [Social support including information about finances, tenancy and legal issues](#)

## Student Enquiries

Got a question? Ask us via [AskMQ](#), or contact [Service Connect](#).

## 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

There are no changes to the offering: the unit will be delivered in online mode the same way as in 2020 and 2021.