BIOL228
Diversity of Life
S1 External 2019
Dept of Biological Sciences

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Caitlin Kordis
Learning Outcomes

1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
2. Give examples of individual organisms that belong to the major animal and plant groups
3. Identify the key anatomical traits used to define major groups
4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
5. Present phylogenetic information in the format of slide show
6. Critically evaluate primary scientific literature in the format of an essay
7. Analyse experimental findings in the format of a scientific report
from the discussions and textbook will be covered. To accommodate externals, 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 such as phyla, classes, and orders.

Practical work constitutes a large proportion of the unit, and the weekly prac sessions are intended to lead on from the group discussion (although some pracs relate to material covered the next week). All prac sessions will be up to 3 hours in duration. The prac sessions for *internals* will held in E8A 120 on Wednesdays and Thursdays. The prac sessions for *externals* will be held in E8A 120 on 9 and 10 March and on 26, 27, and 28 April. 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 internal pracs during weeks 1, 7, 12, and 13.

*Phylogenetic Illustration* (5%)

Creating your own Phylogenetic Illustration will help you to become more familiar with interpreting phylogenies (= evolutionary trees), which are presented many times in the Discussion PDFs and must be understood to profit from this unit. An Illustration consists of a slide show prepared in PowerPoint and saved as a PDF (do not submit the original PowerPoint file!). It includes a phylogeny taken from the literature and at least 15 images drawn from at least 10 websites that illustrate the species included in the phylogeny. The phylogeny must pertain to a taxonomic group (usually a particular family) that comes from a list provide to you in the detailed instructions.

A Turnitin link for the assignment will be made available on iLearn early during the semester. Hard copies may not be submitted. An announcement will be made once the detailed instructions have been released, including the list of papers to be analysed.

Marks will be allotted for accuracy of the title and reference slides (10%); correct and clear presentation of the phylogeny (10%); choice of a phylogeny relevant to the instructions that includes at least 15 particular species (10%); quality and relevance of the species images (60%); and accuracy, formatting, and relevance of the 10 or more distinct URLs (10%).

*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.

The Turnitin link will be made available several weeks before the assignment is due, and finalised instructions will be placed on the iLearn site. Microsoft Word versions are required:
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 Integrity Policy (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%)**: Organisation and coherence of the text, and factual correctness. You must use your own words.

- **Scientific evaluation (30%)**: Organisation of the text, lack of repetition, persuasive answering of questions posed in the instructions, and presentation of a soundly argued personal opinion. 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%.

- **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.

*Practical Report (15%)*

The 1000 word Practical Report will be based on data collected during the Skull Allometry exercise during Week 11 (internals) or the second On Campus Session (externals). The report will be due at the end of Week 13. It will be in the format of a real-world scientific research journal article, except that references are not required.
As with the other assessments, further details will be announced via iLearn during the semester and a Turnitin link will be provided. Again, provide the document in MS Word format, not as a PDF or in a hard copy.

Marks will be allotted for scientific evaluation (50%), adherence to the word limit (10%), and presentation (30%), as discussed in the preceding section. 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, References). An abstract should not be included.

The assignment must also include a graph showing a scatter plot with a fitted regression line, accompanied by an accurate and informative caption (10%).

**Final Examination (35%)**

The Final Examination will cover all the major concepts introduced in the unit. It will include multiple choice questions, short answer questions, and essays. Details will be given in the unit's final discussion. Please consult the official Macquarie website for details on receiving special consideration for the final in order to sit a supplementary exam.

### Assessment Tasks

<table>
<thead>
<tr>
<th>Name</th>
<th>Weighting</th>
<th>Hurdle</th>
<th>Due</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weekly Assessment</strong></td>
<td>25%</td>
<td>No</td>
<td>Weekly</td>
</tr>
<tr>
<td><strong>Phylogenetic Illustration</strong></td>
<td>5%</td>
<td>No</td>
<td>15/03/19</td>
</tr>
<tr>
<td><strong>Literature Review</strong></td>
<td>20%</td>
<td>No</td>
<td>13/04/19</td>
</tr>
<tr>
<td><strong>Practical Report</strong></td>
<td>15%</td>
<td>No</td>
<td>08/06/19</td>
</tr>
<tr>
<td><strong>Final Examination</strong></td>
<td>35%</td>
<td>No</td>
<td>Exam period</td>
</tr>
</tbody>
</table>

**Weekly Assessment**

**Due:** *Weekly*

**Weighting:** *25%

20 question quizzes

This Assessment Task relates to the following Learning Outcomes:

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

**Phylogenetic Illustration**

Due: **15/03/19**  
Weighting: 5%  

slide show including a phylogeny and images of species

This Assessment Task relates to the following Learning Outcomes:

1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms  
2. Give examples of individual organisms that belong to the major animal and plant groups  
5. Present phylogenetic information in the format of slide show

**Literature Review**

Due: **13/04/19**  
Weighting: 20%  

1500 word assignment

This Assessment Task relates to the following Learning Outcomes:

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

**Practical Report**

Due: **08/06/19**  
Weighting: 15%  

1000 word report

This Assessment Task relates to the following Learning Outcomes:
Final Examination

Due: Exam period
Weighting: 35%
heavily based on Discussions

This Assessment Task relates to the following Learning Outcomes:

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

Delivery and Resources

Introduction

Welcome to BIOL228 Diversity of Life, a 3 CP unit that explores the diversity of life on Earth. This unit will probe the form and function, classification, and phylogeny of key plant and animal groups.

Prerequisites for this unit are 12 cp at 100 level or above including BIOL114 and BIOL116.

Unit description

This unit explores the biological diversity of plants and animals. There is a strong emphasis on evolutionary relationships, the fossil record, and key anatomical structures. The unit is suitable for students interested in organismal biology, science education, and research.

Unit delivery and attendance requirements

Workload

Since BIOL228 is a 3 cp unit, you are expected to spend about 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.

Discussions

There will be two one-hour 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. Each week, the first Discussion will be held on Monday at 12:00 in 9 Wallys Walk 102 Theatrette. The second will be held every Tuesday at 3:00 PM in the same room. The Discussions will be recorded live and posted on Echo360 (accessed via the BIOL228 iLearn site). External students are invited to attend the Discussions in person if they wish.

The weekly quizzes will focus on the same PDF material. 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 students who attend them infrequently.
- Lecturers very much appreciate interacting with you personally.

**Weekly practical laboratory sessions**

Each *internal* 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 they will run from 10:00 AM to 1:00 PM and from 2:00 PM to 5:00 PM on Wednesday and Thursday. You must attend at least six pracs to pass the unit.

Each *external* student is expected to attend the two on-campus sessions, which cover the same nine pracs. The first is on 9 and 10 March (a Saturday and Sunday) and will be in 14 Eastern Road – 120 Science Lab. The second is on 26, 27, and 28 April (a Friday, Saturday, and Sunday) and will be in 14 Eastern Road – 160 Science Lab. Sessions will run from 9:00 AM to 5:00 PM. Externals also 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 (i.e. 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**

**Discussion schedule**

<table>
<thead>
<tr>
<th></th>
<th>25 February</th>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>26 February</td>
<td>The History of Life</td>
</tr>
<tr>
<td>3</td>
<td>4 March</td>
<td>Evolution of Ecosystems</td>
</tr>
<tr>
<td>4</td>
<td>5 March</td>
<td>Biodiversity and Extinction</td>
</tr>
<tr>
<td>5</td>
<td>11 March</td>
<td>Microbes</td>
</tr>
<tr>
<td>6</td>
<td>12 March</td>
<td>Land Plants</td>
</tr>
<tr>
<td>7</td>
<td>18 March</td>
<td>Flowering Plants</td>
</tr>
<tr>
<td>8</td>
<td>19 March</td>
<td>Major Plant Families</td>
</tr>
<tr>
<td>9</td>
<td>25 March</td>
<td>Plant Diversity</td>
</tr>
<tr>
<td>10</td>
<td>26 March</td>
<td>Evolution of the Australian Flora</td>
</tr>
<tr>
<td>11</td>
<td>1 April</td>
<td>Plant Reproductive Ecology</td>
</tr>
<tr>
<td>12</td>
<td>2 April</td>
<td>Plant Diversification and Speciation</td>
</tr>
<tr>
<td>13</td>
<td>8 April</td>
<td>Plant Traits and Ecological Strategies</td>
</tr>
<tr>
<td>14</td>
<td>9 April</td>
<td>Porifera and Cnidaria</td>
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<td></td>
<td>13 April – 28 April</td>
<td>RECESS</td>
</tr>
<tr>
<td>15</td>
<td>29 April</td>
<td>Minor Protostomes</td>
</tr>
<tr>
<td>16</td>
<td>30 April</td>
<td>Lophophorates and Molluscs</td>
</tr>
<tr>
<td>17</td>
<td>6 May</td>
<td>Marine Arthropods</td>
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<tr>
<td>18</td>
<td>7 May</td>
<td>Terrestrial Arthropods</td>
</tr>
<tr>
<td>19</td>
<td>13 May</td>
<td>Minor Deuterostomes</td>
</tr>
<tr>
<td>20</td>
<td>14 May</td>
<td>Fishes</td>
</tr>
<tr>
<td>21</td>
<td>20 May</td>
<td>Primitive Tetrapods</td>
</tr>
<tr>
<td>22</td>
<td>21 May</td>
<td>Reptiles Part 1</td>
</tr>
</tbody>
</table>
## Internal practical schedule

<table>
<thead>
<tr>
<th>Practical</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6 and 7 March</td>
<td>The History of Life</td>
</tr>
<tr>
<td>2</td>
<td>13 and 14 March</td>
<td>Leaf Morphology</td>
</tr>
<tr>
<td>3</td>
<td>20 and 21 March</td>
<td>Plant Floral Allometry</td>
</tr>
<tr>
<td>4</td>
<td>27 and 28 March</td>
<td>Bioinformatics and Conservation</td>
</tr>
<tr>
<td>5</td>
<td>3 and 4 April</td>
<td>Invertebrate Body Plans</td>
</tr>
<tr>
<td>6</td>
<td>1 and 2 May</td>
<td>Arthropod Diversity</td>
</tr>
<tr>
<td>7</td>
<td>8 and 9 May</td>
<td>Butterflies</td>
</tr>
<tr>
<td>8</td>
<td>15 and 16 May</td>
<td>Birds</td>
</tr>
<tr>
<td>9</td>
<td>22 and 23 May</td>
<td>Skull Allometry</td>
</tr>
</tbody>
</table>

## External practical schedule

<table>
<thead>
<tr>
<th>Practical</th>
<th>Dates</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9 March</td>
<td>The History of Life</td>
</tr>
<tr>
<td>2</td>
<td>9 March</td>
<td>Leaf Morphology</td>
</tr>
<tr>
<td>3</td>
<td>10 March</td>
<td>Plant Floral Allometry</td>
</tr>
<tr>
<td>4</td>
<td>10 March</td>
<td>Bioinformatics and Conservation</td>
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<tr>
<td>5</td>
<td>26 April</td>
<td>Invertebrate Body Plans</td>
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<tr>
<td>6</td>
<td>26 April</td>
<td>Arthropod Diversity</td>
</tr>
<tr>
<td>7</td>
<td>27 April</td>
<td>Butterflies</td>
</tr>
<tr>
<td>8</td>
<td>27 April</td>
<td>Birds</td>
</tr>
<tr>
<td>9</td>
<td>28 April</td>
<td>Skull Allometry</td>
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Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.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 (https://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 (https://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.

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) provides academic writing resources and study strategies to improve your marks and take control of your study.
Graduate Capabilities

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. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay
• 7. Analyse experimental findings in the format of a scientific report

**Assessment tasks**

• Weekly Assessment
• Phylogenetic Illustration
• Literature Review
• Practical Report
• Final Examination

**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. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
• 2. Give examples of individual organisms that belong to the major animal and plant groups
• 3. Identify the key anatomical traits used to define major groups
• 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
• 5. Present phylogenetic information in the format of slide show
• 6. Critically evaluate primary scientific literature in the format of an essay
• 7. Analyse experimental findings in the format of a scientific report

**Assessment tasks**

• Weekly Assessment
• Phylogenetic Illustration
• Literature Review
• Practical Report
• Final Examination

**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. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay
- 7. Analyse experimental findings in the format of a scientific report

**Assessment tasks**

- Weekly Assessment
- Phylogenetic Illustration
- Literature Review
- Practical Report
- Final Examination

**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. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 3. Identify the key anatomical traits used to define major groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay
- 7. Analyse experimental findings in the format of a scientific report

**Assessment tasks**

- Weekly Assessment
- Phylogenetic Illustration
- Literature Review
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**

- 5. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay

**Assessment task**

- Phylogenetic Illustration

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:

**Learning outcomes**

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 2. Give examples of individual organisms that belong to the major animal and plant groups
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay
- 7. Analyse experimental findings in the format of a scientific report

**Assessment tasks**

- Phylogenetic Illustration
- Literature Review
- Practical Report
- Final Examination
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 outcomes**

- 1. Interpret phylogenetic trees and describe evolutionary relationships amongst groups of organisms
- 4. Explain how these traits are linked to the success of different organisms in solving problems posed by diverse environments
- 5. Present phylogenetic information in the format of slide show
- 6. Critically evaluate primary scientific literature in the format of an essay
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**Assessment tasks**

- Weekly Assessment
- Phylogenetic Illustration
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