# Biology 2019: Plant and Animal Form and Function

Course outline (2026W)
WDE (for Thunder Bay students) & WDF (for Orillia students)

## INFO ABOUT THE ENTIRE COURSE

### Welcome and Course Basics

Welcome to the new Plant and Animal Biology Form and Function course. Since the Biology Department revised its Year 1 courses in 2022, key aspects of plant and animal biology have not been covered in an introductory way to prepare students for more advanced concepts in Year 3 and 4 courses. We have designed Biology 2019 to fill this knowledge gap.

You will be team-taught by two instructors, each of whom is on a different Lakehead campus. Dr. David Law in Orillia will be your instructor for the first half (weeks 1 to 6) and Dr. Janice Hughes in Thunder Bay will be your instructor for the second half (weeks 7 to 12). While the basics of the course will be the same in both halves, such as the hours of instruction and learning outcomes, others will differ, including how you will be evaluated. We list the things common to both halves below, followed by the differences between them. By delivering the course to both campuses this way, we hope you will get to know faculty and students on your sister campus.

- Runs for 13 weeks: Monday January 5 to Friday April 7, including the Winter Study Week break in mid-February. The full academic schedule of dates is here.
- Consists of 12 weeks of 2 x 1.5-h lectures = 3 h of instruction time a week.
- **MyPortal > myCourseLink (mCL) > Biology 2019** is your source for the latest updates and information. Check **Announcements** regularly. We only send emails to the class for urgent matters (e.g., class cancellation on short notice).
- Classes are live (synchronous) on Zoom on Tuesdays and Thursdays, 11:30 AM - 12:50 PM.
- Winter Study Week is Monday, February 17 - Friday, February 21. No classes or labs that week.
- Other important dates are in the academic schedule of dates:
    - Final date to add a 2026W course: Fri. Jan. 16
    - Final date to withdraw from a 2026W course without academic penalty (a/k/a drop date): Fri. March 6
        - We aim to provide you with at least 25% of your final mark by this date so that you can make an informed decision about your progress and projected future performance in the course.

## Calendar description

| | |
|---|---|
| **Course number and name** | Biology 2019: Plant and Animal Form and Function |
| **Description** | Common themes and differences in multicellular plants and animals, emphasizing their shared evolutionary history. Plant evolution, structure, growth, transport, biodiversity and reproduction. Animal body plans, reproduction, development, movement, homeostasis, circulation and gas exchange, nutrition, nervous systems and behaviour. |
| **Credit weight** | 0.5 |
| **Prerequisite(s)** | Biology 1050, 1051 |
| **Offering** | 3-0; or 3-0 |
| **Course classifications** | Type C: Engineering, Mathematical and Natural Sciences |

## Learning Outcomes

By the end of this course, you will be able to:

- Identify plant tissue types, morphology, vegetative and reproductive structures, as well as the basic mechanism of action of plant growth regulators.
- Describe the alternation of generations.
- Recognize diverse plant forms and features relevant to dominant taxonomic groups.
- Describe the diversity of plants.
- Discuss the evolution of plants and recognize how it allowed the emergence of all other forms of life.
- Describe the classification of major invertebrate and vertebrate animal phyla, animal body plans and reproductive strategies.
- Discuss how different phyla of animals are adapted to feed, reproduce, and move from place to place.
- Classify animal phyla and classes based on physical attributes of morphology and internal anatomy.
- Describe aspects of functional anatomy and behavior in animals, and explain how it is adaptive in different phyla.

- Identify physical attributes of animal morphology and internal anatomy, and know how these traits are adaptive to their life histories.
- Distinguish different phyla of animals based on attributes of their morphology, internal anatomy, and behaviour.
- Describe aspects of functional anatomy and behavior in animals, and explain how it is adaptive in different phyla.
- Appreciate that animals and plants share an evolutionary history, including a common eukaryotic ancestor.
- Describe ways in which plants and animals are necessary for each others' existence.
- Discuss the ways in which humans interact with plants and animals.

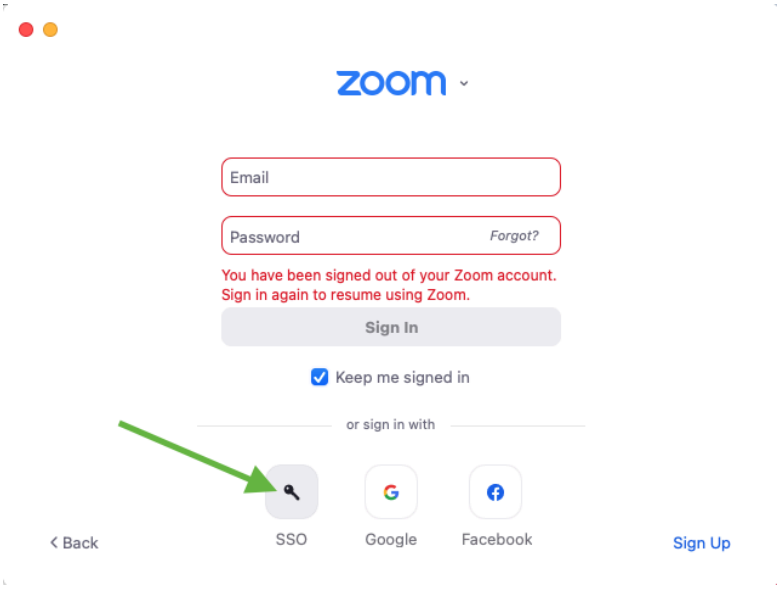
## Tips for Doing Well

### Our lectures are live on Zoom

We will deliver course lectures live (synchronously) on Zoom. We will record the lectures and post these in mCL for your later review. As with all Zoom recordings, the images and voices of students present may be recorded. These recordings are strictly confidential and may be used only by the instructor and students registered in the course only for purposes related to the course, and may not be otherwise shared or distributed. Students who are concerned about being recorded may ask me in an email to exclude them from the recording to the greatest extent possible while recognizing that this may not always be possible. These recordings are made under the authority of sections 3 and 14 of the Lakehead University Act, 1965. Questions about the collection of images and sounds in these recordings may be directed to the Chair of Biology (biology.admin@lakeheadu.ca).

We will provide links to the Zoom sessions in "Calendar" on the right hand side of the mCL course homepage. Sign into the Lakehead SSO (Single Sign-On) portal as you normally do to access mCL. Then sign into Zoom using "Sign in with SSO" for this link to work (see below). Don't use the Email/Password boxes on this page; click the SSO button instead, which will take you to the MyPortal sign-in page. This will ensure that everyone can see your real name in Zoom, and that you can collect participation marks because your name is attached to your Zoom poll answers.

Your first and last name will appear in the lower left corner of your Zoom screen if you're properly signed in (for example, "David Law"). If you don't see your first and last names (for example, you see "dlaw"), you aren't signed in properly and we cannot give you participation marks for that Zoom class. Practice signing in before the first class, signing in via SSO prior to clicking the Zoom meeting link. **It is your responsibility to make sure you are properly signed into Zoom at the start of each class.**




**Be courteous and participate**

Mute your audio if you're not participating on Zoom. While it's up to you whether you turn on your video, we much prefer it if you do.

We should all try to be patient and kind to others during labs and lectures. We both appreciate feedback letting us know what does and doesn't work. Speak up right away so we can attempt to fix any issue you may have.

We ask a lot of questions during lectures and welcome volunteers to answer. Turn on your video and/or audio to do so, whatever you're comfortable with. We may also call on students by name to answer some simple questions during class. This is not to single you out but, rather, to make you more comfortable participating in group work and offering your opinion to others. These are both necessary skills for the rest of your university life and future career.

**Attend lectures to receive participation marks**

Be present during the synchronous lectures to participate in the Zoom poll questions and receive participation marks.

**Take the small stuff seriously**

This course includes several components with a relatively low number of marks awarded to them, such as quizzes, participation, and assignments. It’s often tempting to not take them seriously or choose to skip them entirely. However,  these activities add up to a sizable percentage of your

overall grade and they will absolutely help you understand the course material better. The small stuff counts.

## Learning Materials

### Textbook

We use low- and no-cost learning materials. The textbook is ***Biology 2e.*** a free online textbook. You can also find a copy of this book on the course mCL site under the *Content* tab.

- **Publisher:** OpenStax
- **Senior contributing authors:** Mary Ann Clark, Texas Wesleyan University; Matthew Douglas, Grand Rapids Community College; Jung Choi, Georgia Institute of Technology.
- **Digital ISBN-13:** 978-1-947172-52-4.


Any additional resources (videos, readings, etc.) will be provided on the course mCL site.

**Cost of learning materials**

The information provided below complies with the Ontario Ministry of Colleges, Universities, Research Excellence and Security requirement for disclosing the cost of learning materials to students.

| | |
|---|---|
| **Total cost of textbooks and learning materials** | None |
| **Restrictions preventing students using a different edition of the textbook or other learning material** | None |
| **Use of Open Educational Resources (free resources)** | Yes; links to this material are provided below |
| **Required use of educational materials previously acquired for another course** | None |

**Participation**

You'll be able to participate in class during lectures using **Zoom polling**. You don't have to do anything on your end except vote for a question when we ask it during class. These will be typical iClicker/Kahoot!-type questions: multiple choice, fill in the blank, etc.

In each lecture, you will answer questions that are based on the course material. The participation mark will be equally weighted for

- Attendance, and
- Correct answers.

Therefore, to receive a high participation mark, come to the lectures and do your best to answer the poll questions.

You may miss up to two lectures in each half of the course without penalty to your participation mark. For example, if there are 12 classes in which Dr. Law includes Zoom polling, you need to be present for 10 of these to receive full credit for attendance.

## Deliverables

This class has a large number of deliverables, including discussion posts, short essays, quizzes, etc. You'll need good time management skills to meet deadlines. If you're having trouble finishing coursework in the assigned time, contact your current instructor and/or Student Accessibility Services to find a solution.

Specifics about deliverables are given below and vary depending on instructor.

## Student feedback on teaching and course improvement

We value student feedback to help us improve our courses. This is a new course, so your feedback via the Student Feedback on Teaching (SFT) survey will be especially important to guide development of the course going forward. The SFT will be available for you to complete in March.

## Academic dishonesty

Lakehead has a Student Code of Conduct – Academic Integrity. All students should read the Code and become familiar with it.

To summarize the relevant parts of the Code, the penalty for plagiarism or cheating on any part of this or any other course is zero for the work where the student is caught. Serious or repeated plagiarism, including cheating on an examination or test, will result in a mark of zero for the course and may result in expulsion from Lakehead.

There are three particular places in this course where cheating might occur:

1. submitting written work that you did not research and write;
2. using written or electronic notes to confer with another person in a test or examination; or
3. voting electronically in place of another person using Zoom polling.

Academic dishonesty for any of these areas will result in a mark of **zero** for the work concerned.

To ensure academic fairness for students who work hard, rest assured that we will take every precaution to ensure that potential cheaters are caught and subjected to the appropriate penalty.

## Using artificial intelligence

Wondering whether you can use AI like ChatGPT to complete coursework? You're not alone. First, read Lakehead's checklist for its appropriate use. Using AI may violate the Lakehead Academic Integrity Code (Section III) and be subject to disciplinary action. It's best to check with me prior to using it if you are unsure. There is no shame in doing so since we are very aware of these tools. As this technology evolves, it's up to your instructors to ensure that student marks reflect their own work.

To get an idea about how chatbots can be used in higher ed, watch this Vox video. It summarizes our thoughts about acceptable and unacceptable use of AI to complete coursework.

A list of the possible ways to use AI for your coursework as listed in the Vox video is below. We're OK if you use AI for most of their examples; exceptions are listed below:

**Research**

- Answers to a homework question (sometimes)
    - It's very tempting to let AI do all the work and once you have it for you to say "I have the answer; I'll go back and understand it later". But will you?
    - As long as you're not handing in the answer for marks… where is the ethical line?
- Background information on a topic
- Definitions or explanations of a concept
- Sources to find more information
    - To us, these 3 uses are no different than a Google search or looking up a topic on Wikipedia, but keep in mind how flawed these sources can be
    - Your sources must be
        - Genuine and relevant
        - Specifically, mostly reviews and primary literature articles from peer-reviewed journals
- Summaries of readings and lectures
- Study guides for an exam
    - OK, but read and/or watch these first to make sure you understand and can summarize them without AI help

**Ideas**

- Ideas for how to respond to an assignment
    - But not using AI to actually write your assignment…again, where is the line?
- Instructions for solving a problem

    - But don't rely on it to do your work for you since you'll have to do it yourself on a test
- Outline for a paper or presentation
    - AI can suggest how to best organize your thoughts
- Examples, analogies and counterarguments
    - Use at your own risk

**Writing**

- Script for a presentation
    - As long as it's based on your own original work and not AI-generated text… AI summarizing AI is bad
- Feedback on your work
    - This one is for your profs. We haven't used AI yet for this purpose, but can see how it might be useful
- Revision of a text to improve it
    - While being aware that AI doesn't always "improve" written work
- Revision of a text to change word count
    - Sometimes a necessary editing step
    - Summarizing and collating ideas is a key part of work life, and AI doesn't always do a great job

There's only one use of AI from the Vox list that we consider plagiarism:

- Writing a draft of a paper or discussion post
    - It's too tempting to let it do all the work, including writing the final version

## INFO ABOUT PART 1 WITH DR. LAW

### About your instructor

Hi all, I'm Dave Law, an associate professor in Biology. I've been a faculty member at Lakehead since 2004. I spent 12 years in Thunder Bay before moving to Orillia in 2016 to lead the development of the Applied Life Sciences program here. My research background is in plant biochemistry, and I'm excited to teach the first plant-intensive half of this new Biology course.

| | |
|---|---|
| **Name** | Dr. David Law |
| **Office** | Simcoe Hall/OA 3004 in Orillia |
| **Email** | dlaw@lakeheadu.ca. I check my email daily Monday to Friday, and will try to respond to your questions as quickly as possible during those days. |
| **Office hour** | No preset office hour; email me or make an appointment here for a Zoom meeting. |
| **Phone number** | None; email me or make an appointment here for a Zoom meeting. |
| **Call me** | Dr. Law or David |
| **Preferred pronouns** | He, him, you |

**Lecture schedule**

Following is a preliminary lecture schedule. Slide PPTs are generally available for download from mCL on the evening prior to the lecture.

| Week | Dates | Subject | *B2e* reference |
|---|---|---|---|
| 1 | Jan. 5-9 | Review of plant basics from year 1 biology (review *B2e* material as needed) | 22.1, 22.2, 22.3<br>23.1, 23.3<br>Chp. 25<br>Chp. 26 |
| | | Plant cell types and tissues | 30 intro<br>30.1 |
| 2 | Jan. 12-16 | Stems<br>Roots | 30.2<br>30.3 |
| | | Leaves<br>Transport of water and solutes | 30.4<br>30.5 |
| 3 | Jan. 19-23 | Plant sensory systems and responses | 30.6 |
| | | Nutritional requirements of plants | 31 intro<br>31.1 |
| 4 | Jan. 26-30 | The soil | 31.2 |
| | | Nutritional adaptations of plants | 31.3 |
| 5 | Feb. 2-6 | Reproductive development and structure | 32 intro<br>32.1 |
| | | Pollination and fertilization | 32.2 |
| 6 | Feb. 9-13 | Asexual reproduction | 32.3 |
| | | Poisonous plants | Notes |

## Marking scheme

| Deliverable | % of final mark | |
|---|---|---|
| | Each | Total |
| 2 mCL discussion posts | 11 | 22 |
| 6 weekly D2L quizzes | 4 | 24 |
| Participation via Zoom polling | | 4 |
| **Subtotal** | | **50** |

## Quizzes

If you miss a quiz, you may write a replacement test, but you must provide acceptable supporting documentation within 48 h of the missed test to your current instructor. If required, there will be one date for a make-up test and no make-up test can be written after the test results have been returned to the class. This also applies to students registered with Student Accessibility Services (SAS). SAS-enrolled students will have quiz timing adjusted to match their accommodations.

**Do the breakout questions**

I will end each lecture with some relevant questions, and we'll work on answering them together. I am not expecting perfect answers but want you to think about the questions and answers. While I don't mark your answers to the breakout questions, there's a good chance that similar questions will appear on the weekly tests, so participating in answering the breakout questions is excellent prep for doing well on the tests.

## Discussion posts

Posting answers to questions in forums helps you understand the course content, deepens your learning experience and sharpens your critical thinking skills.

Post **twice** during the first half of the course, with a **maximum of one post per week**. For each of the 6 written discussion forums during the first half of the course, I will post specific instructions, such as "post one reply to other posts to obtain your participation marks for this forum."

I will post topics in each forum. One student may reply directly to each of my original topics; there is thus an advantage to posting early. Further posts must be formatted as replies to those student posts and not directly as replies to my original post. This means **only one thread is allowed for each discussion topic**. Replying to others' posts will encourage your

- deep thought about the subject,
- consideration of other students' points of view, and
- formatting of discussion topics like a conversation, often one that does not have one right answer, rather than an information download.

Thus, other than the first reply to each discussion topic, further direct replies to the original topics will not count as posts towards your mark for that forum.

I may also contribute to the forums to try to clarify arguments and prod further thought and replies. I encourage you to reply to my posts… I will be respectful of your point of view.
How do you contribute effectively to discussion forums? Follow these discussion guidelines from Debbie Morrison's *Online Learning Insights* for some hints:

- Use a subject line that relates to your post; this will help create interest and focus for the discussion.
- Write clearly and with expression. Communicating online requires careful and concise writing, but also allows your personality to come through. Though humour is effective and at times relevant in discussion, be sure to avoid sarcasm, which does not translate well online.
- Be supportive, considerate and constructive when replying to your classmates. Do not use jargon, slang or inappropriate language. If you disagree with a classmate, please respond in a respectful and tactful manner. Any posts that I deem inappropriate will be removed from the discussion board.
- Focus on the topic, relating any class readings and materials from the current module in your post (as applicable).
- Proofread and review your response before hitting the submit button.
- Participate regularly. Improve your learning by being an active and engaged student. Follow and participate in the assigned discussion throughout the module, logging on at least every couple of days while reading and participating in forums as assigned in the module.
- One post allowed per week.

Access the discussion forums by module in mCL.

## INFO ABOUT PART 2 WITH DR. HUGHES

### About your instructor

Hi, my name is Dr. Janice Hughes and I am a Professor in the Department of Biology at the Thunder Bay campus. I've been teaching at Lakehead since 2000. I'm an ornithologist, and my interests include the behavioural ecology of birds; in particular, cuckoos and other avian brood parasites. I'm looking forward to teaching the animal half of this course, and I promise I won't talk too much about birds!

| | |
|---|---|
| **Name** | Dr. Janice Hughes |
| **Office** | Centennial Building/CB 4052 in Thunder Bay |
| **Email** | jmhughes@lakeheadu.ca I check my email daily Monday to Friday, and will try to respond to your questions as quickly as possible during those days. |
| **Office hour** | Office hours Wednesday at 10:00 am on Zoom; Zoom office hours also available by appointment, just email me |
| **Phone number** | None; email me or make an appointment for a Zoom meeting |
| **Call me** | Dr. Hughes or Janice |
| **Preferred pronouns** | She, her, you |

**Lecture info**

| Week | Dates | Subject | *B2e* reference |
|---|---|---|---|
| 7 | Feb. 23-27 | Unit 1: Animal body plans | 27.2, 33.1 |
| | | Unit 2: Reproduction and early development | 43.1-43.2, 43.3, 43.6 |
| 8 | Mar. 2-6 | Unit 3: Support and locomotion | 33.2, 38.1; 38.3-38.4 Readings* |
| 9 | Mar. 9-13 | Unit 4: Respiration and circulation | 39.1, 39.3, 40.1 |
| | | Unit 5: Digestion and nutrition | 34.1 |
| 10 | Mar. 16-20 | Unit 6: Homeostasis | 33.3, 41.1, 41.2, 41. 3 |

| | | | |
|---|---|---|---|
| | | March 19: Midterm test (Unit 1: Body plans to Unit 4: Respiration) | |
| 11 | Mar. 23-27 | Unit 7: Nervous system and senses | 35.4, 36.1-36.5 |
| 12 | Mar. 30- Apr. 3 | Unit 8: Behavioural ecology | 45.1; 45.7<br>Readings* |

*A more detailed list of suggested readings is provided on mCL.

**Marking scheme**

| **Deliverable** | **% of final mark** | |
|---|---|---|
| | **Each** | **Total** |
| 3 Skill-building assignments (due March 8, 22, and April 5) | 3+2+3 | 8 |
| Midterm exam (March 19; Units 1-4) | 15 | 15 |
| Final exam (TBA; during final exam period in April) | 25 | 25 |
| Participation via Zoom polling | | 2 |
| **Subtotal** | | **50** |

**Exams**

The midterm and final exams will be run online through the mCL course webpage. The exams are open book. The midterm test is 60 minutes in length and will be held during the regular class time on March 19. It will cover material from Unit 1 (Animal Body Plans) to Unit 4 (Respiration and Circulation). The final exam is two hours in length and will occur during the April exam period. The final exam is cumulative, and will include material from Units 1 through 8. You will not be allowed to begin exams more than 10 minutes late, and any questions answered after the posted closing time of the exam will not be marked. Additional instructions on test/exam protocols are posted under *Content->Outlines and Important Information->Animal Form and Function Online Test Instructions.*

In addition to being responsible for content provided in lectures, several questions on the midterm and final exams will be based on relevant academic journal articles. The articles are available for download on mCL under *Content->Animal Form and Function->Study Materials and*

*Required Reading*. This material is not cumulative; articles on the midterm will not be tested on the final exam.

The midterm exam will include material from two journal articles:

(1) Katona, G., et al. (2023) Evolution of reproductive modes in sharks and rays. Journal of Evolutionary Biology 36:1630-1640.
(2) Harrison, J. F., et al. (2010) Atmospheric oxygen level and the evolution of insect body size. Proceedings of the Royal Society B 277:1937-1946.

The final exam will include material from three journal articles:

(1) Brice, P. H. (2009) Thermoregulation in monotremes: riddles in a mosaic. Australian Journal of Zoology 57:255-263.
(2) Stevens, K. A. (2006) Binocular vision in theropod dinosaurs. Journal of Vertebrate Paleontology 26:321-330.
(3) von Bayern, A. M. P. (2018) Compound tool use construction by New Caledonia crows. Scientific Reports 8:15676.

If you miss a test or quiz due to illness, you must inform me by email within 24 hours of the scheduled test time; otherwise, you may not be able to write a make-up test. Athletes who will miss a midterm test due to competitions must provide a letter or email from their coach in advance that clearly shows the dates of their competitions. No other excuses (e.g., vacations, sleeping in, or non-university related activities) for missing tests will be accepted.

If you miss the final exam, you must follow the procedures outlined by Enrolment Services before a make-up exam can be rescheduled. I cannot reschedule the final exam. More information can be found at *https://www.lakeheadu.ca/studentcentral/exams-grades/exam-central*.

**Assignments**

There are three assignments designed to build important academic skills, including referencing and researching. Detailed instructions and worksheets can be found on mCL under *Content->Animal Form and Function->Assignments* Make sure that you read the instructions carefully, and email me with your questions or ask them in class. Assignments must be converted to PDFs and uploaded to the appropriate assignment dropbox on mCL by the due date. In brief, the assignments are:

Assignment 1: Reorder the References: Put a reference list in the correct alphabetical order. (due March 8)
Assignment 2: Definitions: Match the terms with the definitions (due March 22)
Assignment 3: Library Scavenger Hunt: Find five journal articles through our online library and answer questions about those papers. (Due April 5)

Late assignments will be accepted but a penalty of 10% per day will be imposed. If you are handing an assignment in late, email me to let me know so that I can reopen the dropbox. Please don't email your assignments to me.

**Other Information**

I am fully committed to providing all recommended accommodations for students with disabilities who are registered with Student Accessibility Services. Please feel free to make an appointment with me to discuss these options.