

Biology 1050: Introduction to cell and molecular biology

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FAO section

2026F

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THE BASICS

About the instructor

My name	Dr. David Law
My office	Simcoe Hall/OA 3004
My 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.
My phone number	None; email me or make an appointment here for a Zoom meeting.
Call me	Dr. Law
My preferred pronouns	He, him, you

About the class

- The course runs for 13 weeks: Tuesday September 8 to Thursday December 3. The 2026-7 academic schedule of dates is [here](#).
- The course has 12 weeks of 2 x 1.5-h lectures. There are no classes the week of October 12-16 due to the Lakehead fall study week.
- Biology 1050 lectures and labs are offered in-person on the Orillia campus.
- All course material is posted on myCourseLink/D2L (mCL); check there for the latest course updates and information.
- There is 6 h total instruction time each week:
 - Lectures: 3 h/week
 - OA building, room 2018
 - Tuesday and Thursday, 10:00 - 11:20 AM
 - Labs: 3 h/week
 - OA building, room 3002
 - One of:
 - FO1: Friday, 11:30 AM - 2:30 PM (lab instructor: Dr. Usha Menon)
 - FO2: Tuesday, 2:30 - 5:30 PM (lab instructor: Dr. Usha Menon)
 - FO3: Friday, 2:30 - 5:30 PM (lab instructor: TBD)

- All lab information is on the separate BIOL-1050-FO1/2/3 mCL site
- Ask your lab instructor directly about all lab-related matters.

[Calendar description](#)

Biology 1050 | Introduction to Cell and Molecular Biology

Description	An introduction to the chemical, cellular and molecular processes that enable organisms to be alive. The definition of life; the scientific method; the chemistry of life; the structure and functions of cells; photosynthesis and cellular respiration; cell division and sexual reproduction; the functions of nucleic acids and proteins; and biotechnology in agriculture and medicine. Lecture concepts are reinforced through hands-on exercises in laboratory sessions.
Credit weight	0.5 FCE
Offering	3-3; 0-0
Notes	Students who have previous credit for Biology 1130 cannot take Biology 1050 for credit. An additional fee (see Miscellaneous Fees) is required for this course.
Course classification(s)	Type C: Engineering, Mathematical and Natural Sciences

Instructor's note: under "Offering", (a) "3-3" means 3 hours of lectures plus 3 hours of labs a week; (b) "3-3; 0-0" means that the course is offered in the fall term only; winter term courses will have numbers after the semicolon.

Important dates

Take note of the following important dates, as per the [academic schedule of dates](#):

- Final date to add a course for 2026F or Y: Mon. Sept. 21
- Final date to withdraw from a course without academic penalty ("drop date"): Fri. Nov. 6
 - I 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.

LEARNING OUTCOMES

- Recognize and use common biology terms
- Recognize the properties common to all organisms
- Understand how the control of chemical reactions is critical for organisms
- Describe how the structure of cells allows them to regulate their metabolism
- Identify the biochemical pathways in cells that allow them to obtain energy
- Describe how plants use light energy to power life on Earth
- Describe how cells reproduce by dividing their genetic and cytoplasmic material
- Discuss how sexual reproduction is critical for evolution by natural selection
- Outline how cells selectively translate DNA sequences into proteins
- Describe the uses of biotechnology in agriculture and medicine
- Develop soft biological skills, such as working with your peers and public speaking
- Conceive, write and deliver written work by applying information obtained in lecture, from your textbook and from other scientific sources found in the library

WHAT TO EXPECT IN CLASS

All of my lectures will be delivered in-person. Occasionally, I may teach via Zoom instead; if that happens, I'll provide a link to the Zoom session in Calendar on the right hand side of the mCL course homepage.

Be courteous and participate

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

I ask a lot of questions during lectures. I welcome volunteers to answer. I also plan to call on students by name to answer some simple questions during class, so be prepared for that. This isn't to embarrass you but rather to make you more comfortable participating in group work and offering your opinion in front of others, both of which will be a major part of your university life and future career.

Do the review questions in the breakout groups

I will end each lecture with some questions that you'll answer in breakout groups of around 4 to 6 students each. One person per group will answer their question. I'm not expecting perfect answers but want you to think about the questions and answers. While I do not mark your group's answers to the breakout question you are assigned in class, there's a good chance that

similar questions will appear on the midterms and final exam, so participating in the breakout groups is excellent prep for doing well on the tests.

Attend lectures to receive participation marks

You have to be present during lectures to participate in the iClicker questions and receive participation marks. Also, attending class is key to getting a good grade.

LEARNING MATERIALS

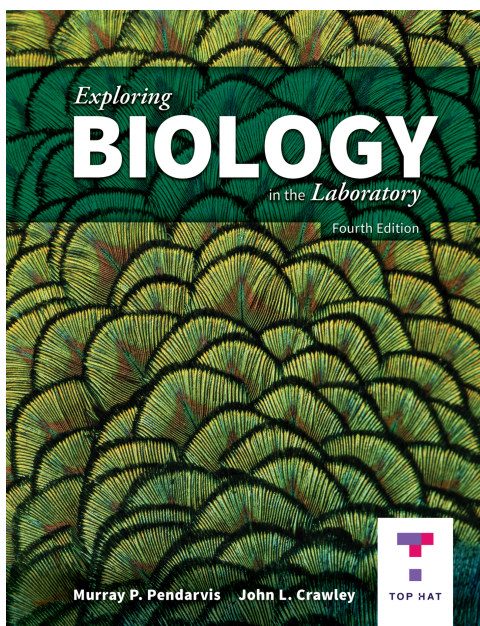
These are all **required**.

Textbooks

- The laboratory manual *Exploring Biology in the Laboratory 4e*, Murray P. Pendarvis and John L. Crowley (4th edition, 2024), Top Hat, Toronto, eISBN-13: 9781834030494.

E-version only; no paper copy is available.

- Available from the [Lakehead Bookstore](#): \$96.
- Also available direct from [Top Hat](#) at a higher price; if you buy from them, only get the **Interactive eText (Read + Study)** version.
- Most of you will also use this lab manual next term in **BIOL-1051: Intro to ecology and biodiversity**, so you'll need to access it until the end of April; I thus recommend buying rather than renting.
- The 2021 3rd edition (paper or e-version) is acceptable.



We use a free electronic OpenStax textbook in the lecture portion of the course:

- [Concepts of Biology](#). Senior contributing authors Samantha Fowler, Rebecca Roush and James Wise (2021); Digital ISBN-13: 978-1-947172-03-6.



There is also a more advanced version of this textbook (also online and free) that we will occasionally consult, or for those who want to read a more advanced explanation of the concepts we cover in class:

- [Biology 2e.](#)
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



iClicker

- The [iClicker Student mobile app](#) for your mobile device. When you install it, you'll be ready to participate and receive marks for the in-class polling that will start in the first class. See

further info below for how this works under “Student participation”. Trial access is free for 2 weeks; after that, you must pay to continue using it; 6-month access is C\$16.

Cost of textbooks and learning materials

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

Cost of textbooks and learning materials	\$16 for iClicker Student + \$96 for <i>Exploring Biology 4e</i> lab manual (also used in BIOL-1051) = \$112
Restrictions preventing students using a different edition of the textbook or other learning material	None; <i>Exploring Biology 3e</i> is acceptable.
Use of Open Educational Resources (free resources)	Yes; course uses free OpenStax textbook
Required use of educational materials previously acquired for another course	No

LECTURE SCHEDULE

Following is a preliminary lecture schedule. Lecture slide stacks are generally available for download from mCL the evening prior to the lecture.

The CoB readings (with [hyperlinks](#) below) are required; the *EB* (except where required for the labs) and *B2e* readings (greyed out below) are optional.

Week starting Sunday...	Topics	Reading (chapter/section)		
		<i>Concepts of Biology</i>	<i>Exploring Biology</i>	<i>Biology 2e</i>
Sept. 6	Course welcome			
	Introduction to biology; the scientific method	• 1	• 1	• 1
Sept. 13	"	"	"	"
	The chemistry of life	• 2	• 4 intro • 5 intro	• 2 • 3
Sept. 20	"	"	"	"
	Cell structure and function: cell theory; prokaryotes and eukaryotes; endosymbiosis	• 3.1 • 3.2 • 13.2	• 5 intro • 6 intro • 6.1 • 8 intro	• 4.1 • 4.2
Sept. 27	Eukaryotic cells	• 3.3	• 6.2 • 6.3 • 6.4	• 4.3
	Test #1: Thurs. Oct. 1			
Oct. 4	Membranes and transport	• 3.4 • 3.5 • 3.6	• 8	• 5 intro • 5.1 • 5.2 • 5.3
	"	"	"	"
Oct. 11	Lakehead fall study break (no classes)			

Oct. 18	How cells obtain energy: cellular respiration	• 4 intro • 4.1 • 4.2 • 4.3	• 10	• 7
	"	"	"	"
Oct. 25	Energy, metabolism and enzymes	• 4.1	• 7	• 6.5
Oct. 26	Photosynthesis: how plants build the living world	• 5	• 9	• 8
	"	"	"	"
Nov. 1	Reproduction at the cellular level: mitosis	• 6.1 • 6.2	• 11	• 10
	Test #2: Thurs. Nov. 5			
Nov. 8	"	"	"	"
	The cellular basis of inheritance: sexual reproduction and meiosis	• 7.1 • 7.2	• 12	• 11
Nov. 15	"	"	"	"
	Molecular biology: information flow in cells	• 9 intro • 9.1 • 9.2 • 9.3 • 9.4 • 9.5	• 14	• 14.2 • 14.3 • 14.5 • 14.6 • 15.1 • 15.3 • 15.4 • 15.5
Nov. 22	"	"	"	"
	Biotechnology	• 10 intro • 10.1	• 15	• 17 intro • 17.1
Nov. 29	Catch up and test #3 review			

See your lab schedule and content at the BIOL-1050-FO1/2/3 mCL site.

MARKING SCHEME

- Test #1: **15%**
- Test #2: **20%**
- Test #3 (final exam): **20%**
- Course participation: **5%**
- Labs (more details at your lab mCL site): **40%**

STUDENT PARTICIPATION

You'll participate during class using the **iClicker Student** app for your smartphone/tablet/laptop/other device. Buy it from your device's app store and install it.

Open the app, create an account, then link it to the course by

- Using [this join code](#),



- Scanning this QR code , or
- [Searching for my name](#) at the **Lakehead University-Orillia** campus and choosing **BIOL-1050-FAO: Intro to cell and molecular biology**.

The cost is ~C\$16 for a 6-month subscription. Using it is for free for the first 2 weeks, but after that time you'll have to pay to keep using it.

Bring your device with the app on it to each class. You'll use it to answer questions and receive participation marks.

Some students have asked me to choose a free polling app (e.g., the basic version of Top Hat; Kahoot!; Zoom polling) rather than a paid version. I have researched them and found that iClicker Student best meets my and your need for participation tracking, user friendliness and reliability.

Five percent of your final mark is allocated to participation. In each lecture, you will use the clicker to answer questions that are based on the course material using the iClicker during my lectures. The 5% participation mark will be equally weighted for

- attendance (2.5%), and
- correct answers (2.5%).

Therefore, to receive a high participation mark, you have to be both physically and mentally present in class.

You may miss 2 lectures during the term without penalty to your participation mark. For example, if there are 20 classes where we vote with iClicker, you need to be present for 18 of these to receive full credit for attendance. You cannot make up participation marks for missed lectures. Concerned about answering correctly? You can discuss answers with your friends before answering, and each question is worth $2.5\% / 60 = \sim 0.04\%$ of your final mark.

I'll give you some additional information on the technology in the first class.

COURSE IMPROVEMENT

I value student feedback to help me improve my courses. Below are some data from the [Student Feedback on Teaching \(SFT\) survey](#) in 2026F. The comments are complete and unedited (except for spelling and grammar, or to anonymize them).

Marks

For the [23 questions](#) where 1 = strongly disagree (worse score) and 5 = strongly agree (better score),

- Average score = 4.7 (out of 5)
- Standard deviation = 0.1
- Number of survey participants = 13 out of 38 students

Comments

What did you like about this course?

- I found Dr.Laws approach very enthusiastic and it was clear he enjoys teaching and the subject. he is very approachable and his outside examples make it easier to learn the course material.
- I really liked how Dr. Law regularly drew diagrams during lectures and explained concepts in clear, detailed steps. It really helped me follow along and understand the course material much better.
- I valued the variety of discussion and engagement opportunities in the class. In particular, I valued the way Dr Law used these various engagement opportunities to effectively train us in the best ways to answer test questions completely.
- I really liked the hands on learning we did with play-dough when learning about mitosis and meiosis, and the I-clicker questions in class.

- I enjoyed the IClicker and the breakout questions since they help me figure out where my knowledge gaps are and form a comprehensive answer to more long answer questions. I very much enjoyed this course and I plan on taking more courses taught by you in the future.
- I enjoyed how the professor would explain the concepts and make us understand and test our knowledge through the in class quizzes, and the breakout questions. Tests were reasonable and content was interesting.
- Lectures are always engaging and interactive, requiring you to think critically about the material.
- I like how when he teaches he doesn't just read off the slide he speaks to the students and adds on important information. I like the concept of iclicker and the breakout questions to get us to think deeper about the concepts that we're learning.
- The content, activities, testing methods and prof
- I appreciate how the evaluations were split into two parts instead of midterm and final exam. Especially having it being on 3-4 lectures at a time and not having to study upon all topics at once.
- I like the multiple ways of learning provided- from textbook, lectures and videos. The breakout questions were a great way to work with other students and further our learning.
- very engaging
- I was a little scared to attempt taking Biology again since it has been a while, but Dr. Law made me feel a lot more comfortable. I think the test format is great, as it appeals to a variety of students, gave us options, and set clear expectations about what was going to be on the test. The in-class questions, crash course videos, and the text book questions were also great for studying, and allowed me to check how well I was understanding the lesson as we progressed.

What suggestions do you have for improving this course?

- none.
- Some additional assignments or alternative forms of assessment would be helpful for students to demonstrate their understanding, especially for those who do not perform as well on larger exams.
- I don't have any suggestions to improve this course
- My only suggestion would be to find a free form to do the quizzes. This was the only course I had to pay extra for something so little as the quizzes. D2L has enough features for that or even a google form.
- Maybe for the tests there could be a clearer outline on what he would like us to study or try to make the questions equally cover all topics in the slideshow. There could be up to 160 slides worth of content being presented onto a test out of 40 marks. I feel as though someone who studied hard but focused on one part of the slides over the others aren't

guaranteed success, getting a low mark on the test doesn't necessarily mean they didn't try but maybe the learning objectives or emphasis on what's more important isn't clear enough. For example midterm two did not have a lot of thermodynamic questions it was mostly photosynthesis and cellular respiration but it could have been made more clear that thermodynamics wasn't as equally important. Also if the labs didn't have to be every single week that would be cool too! But of course that can't be helped.

- More hands on things like what we did with the play doh
- Suggestions I have for improving this course is if a breakdown of what would be on the evaluations would be. I as a student find it best where I get to focus on what would be asked about on an exam whereas if I study all content there are times where I study for wouldn't be on it. It just saves time on trying to fit in as much as to what to know.
- I am not sure what other options/apps are out there, but I think it would help a lot of students if they did not have to pay in order to receive participation marks, or at least not have to pay so much if they only need the app for one course and one semester.

Additional Comments

- i would heavy consider taking other unrelated courses if Dr Law is the professor. he is amazing
- Dr. Law was a very enthusiastic, knowledgeable, and kind professor. His teaching style made the course engaging, and his support was very appreciated.
- Studying biology with Dr Law was an equally informative and joyful experience- Dr Law's passion for and excitement about his field/subject is omnipresent in his presentation and delivery of the course material
- Initially I was quite intimidated by the course content, and Dr. Law's expectations of the class, but after talking to him outside of class a few times, I discovered he's actually a very friendly, helpful prof.
- Overall enjoyed the course.
- The instructor Dr. Law is very kind and teaches in a very engaging way which creates a welcoming environment and is not rude or passive aggressive to the students. He clearly has a passion for not only what he's teaching but also teaching itself which creates a positive environment making others excited to learn as well.
- Great prof:)

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 I'm 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 my 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. I'm 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 me, 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. I haven't used AI yet for this purpose, but I 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 I 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

ACADEMIC DISHONESTY

Lakehead has a [Student Code of Conduct – Academic Integrity](#). All students in this course 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 the iClicker Student app.

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 the course instructors will take **every precaution** to ensure that potential cheaters are caught and subjected to the appropriate penalty.