

Lakehead University

BIOL-1130-FA



Plant Biology
Laboratory Manual
Fall 2018

Course Instructor:
TBD

Laboratory Technician:
Dr. Susanne E. Walford

STUDENT'S NAME

Contents

A.	About the cover	8
B.	About this manual	8
C.	Syllabus	9
D.	Introduction to our laboratory program	15
E.	Safety guidelines	18
F.	MyCourseLink	20
G.	iClicker registration and use	22
H.	Biological terms	28
I.	Biology web site	30
LABORATORY EXERCISES		31
1	Safety, microscopes and the field of plant biology	33
1.1	Objectives	33
1.2	Introduction and safety	33
1.3	Compound microscopes	36
1.4	The field of plant biology	48
1.5	Practice questions - prepare for the online quiz!	59
1.6	Check list	59
Quiz 1		61
Assignment 1		63
2	Cells, tissues, mitosis, and meiosis	65
2.1	Objectives	65
2.2	Drawing and labelling microscope images	65

2.3	Plant cells	66
2.4	Cells of the ground tissue	66
2.5	Cells of the dermal tissue	69
2.6	Cells of the vascular tissue	71
2.7	Review of genetic concepts	72
2.8	Mitosis and cytokinesis	73
2.9	Meiosis	77
2.10	Clean up	84
2.11	Practice questions	84
2.12	Check list	88
Quiz 2		89
3 Plant organs: Stems, roots, leaves		91
3.1	Objectives	91
3.2	Introduction	91
3.3	Primary growth	92
3.4	Roots	92
3.5	Stems	96
3.6	Leaves	98
3.7	Leaf arrangement on stems	102
3.8	Clean up	103
3.9	Check list	103
Quiz 3		106
Assignment 2		107
4 Practising the scientific method: Photosynthesis		113
4.1	Objectives	113
4.2	Important notes	113
4.3	Scientific inquiry: Object in a bag	114
4.4	Experiment: Photosynthesis by aquatic plants	117
4.5	IMPORTANT!!! DON'T LEAVE UNTIL DONE!!!	126

4.6	Clean-up	126
4.7	Poster suggestions	126
4.8	Post-lab check list	128
Assignment 3		129
5	Cyanobacteria and Algae	131
5.1	Objectives	131
5.2	Wet mounts	131
5.3	Introduction	132
5.4	Cyanobacteria	132
5.5	Life cycles for eukaryotes	135
5.6	Plant-like algae that are NOT plants	138
5.7	Algae that ARE related to plants	141
5.8	Check list	148
Quiz 4		149
6	Non-vascular plants	151
6.1	Taxonomic summary	151
6.2	Objectives	152
6.3	Introduction	152
6.4	Marchantiophyta: Liverworts	153
6.5	Bryophyta: Mosses	157
6.6	Clean up	162
6.7	Review question	162
6.8	Check list	162
7	Seedless vascular plants	165
7.1	Taxonomic summary	165
7.2	Objectives	166
7.3	Introduction	166
7.4	Lycopodiopsida	166
7.5	Polypodiopsida	172

7.6	Clean up	178
7.7	Check list	178
Quiz 5		179
8	Gymnosperms	181
8.1	Taxonomic summary	181
8.2	Objectives	182
8.3	Introduction	182
8.4	Reproduction in conifers	183
8.5	Conifer anatomy	188
8.6	Clean-up	193
8.7	Check list	193
9	Angiosperms	195
9.1	Taxonomic summary	195
9.2	Objectives	196
9.3	Introduction	196
9.4	Anatomy of the flower	196
9.5	Pollination, double fertilization, and seeds	204
9.6	Fruits	205
9.7	Stems	207
9.8	Clean-up	208
9.9	Check list	209
Quiz 6		210
10	Review week	211
10.1	Objective	211
10.2	Exam information	211
10.3	Review format	211
10.4	Mock exam	212
10.5	TA evaluations	212

11 Bell ringer exam 2018	213
11.1 Objective	213
11.2 Exam details	213
A Instructions Remark Exam Forms	217
B Course and TA Evaluation form for BIOL 1130FA	221
C Taxonomic summary for our survey of plants and their predecessors	225
D Acronyms	229
Bibliography	234

A. About the cover

The first section of the course introduces you to plant form and function. The second section covers photosynthetic plant predecessors followed by major taxonomic groupings in the kingdom Plantae. The epitome of plant evolution are the angiosperms which produce seeds in a fruit. The class of 2017 are viewing the classifications of fruits. All photos copyright S.E. Walford unless otherwise referenced.

B. About this manual

Although many exercises are original and have a “northern” flavour, the contents of this lab manual are in large part borrowed, expanded, or shortened versions of botany exercises typically presented in first year. I would like to express special thanks to James Schaefer, Diana Abraham, and Lynn Ruxton for their efforts on earlier versions of this manual.

Each year students perform an experiment and collect data for a scientific poster. This experiment is DIFFERENT each year. Assignments, quizzes, and drawings also change year-to-year. Therefore, any older versions of the lab manual for this course should be discarded!

Each week explore the materials on display rather than just glancing at them and taking pictures. Touch and feel. Observe and understand!

Ancient Chinese Proverb:

I hear and I forget,
I see and I remember,
I touch and I understand.

Modern American Proverb:

The illiterate of the 21st century will not be those who cannot read and write,
but those who cannot learn, unlearn, and relearn.

-Alvin Toffler

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C. Syllabus

a) Course description

An introduction to plant diversity stressing the evolution of plants. Comparative morphology of vegetative and reproductive structures will be emphasized. Topics will also include functional anatomy, photosynthesis and respiration.

This course consists of **3 hours of lecture** and **3 hours of lab** each week and is worth 0.5 course credits.

b) Course materials

Lecture supplies

- **REQUIRED TEXTBOOK: Stern's Introductory Plant Biology, 14th edition** from McGraw Hill (Bidlack and Jansky, 2018). Older editions or other first year plant biology textbooks (e.g. Mauseth, Raven) are good (more indepth) substitutes.
- Pen and paper (to take notes!!!!)

Lab supplies

- **REQUIRED: 2018 Lab Manual.** Old versions are NOT acceptable. Purchase via bookstore. A PDF colour version will be posted on MyCourseLink for download to devices. Black and white bookstore purchase will be more economical than printing it out at home.
- **REQUIRED: iClicker 2 remotes.** Older remotes will work.
- **OPTIONAL: A Photographic Atlas for the Botany Laboratory, 7th ed.** from Morton Publishing is suggested, and older editions are fine. Compare your edition with those of TAs during your lab sessions. An Errata for the 7th edition is posted on MyCourseLink.
- Lab coats optional for the experiment lab. Safety glasses required. Gloves supplied. If you have a latex allergy/sensitivity let instructor know.

BRING YOUR LAB MANUAL, TEXTBOOK, and iClicker REMOTE TO EVERY LAB! If iClickers are being used for LECTURES, bring it!

A Photographic Atlas for the Botany Laboratory, 7th ed. from Morton Publishing is suggested, with older editions are fine. Compare your edition with those of TAs during your lab sessions. An Errata for the 7th edition is posted on MyCourseLink.

PLEASE WRITE YOUR NAME AND/OR EMAIL ADDRESS IN ALL YOUR BOOKS. If they are left behind in a lab or lecture we **WILL** contact you.



c) Laboratory topics for BIOL1130FA

Lab Technician: Dr. Susanne E. Walford

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Phone: 343-8593

Email: swalford@lakeheadu.ca

Table 1: Laboratory schedule. Labs start the week of September 10; NO labs week of September 3! **Tuesday sections are F1, F2, F3, F5 and Monday section is F4.** Fall courses begin Tuesday September 4 and end Monday December 3. Final registration date is Monday September 17, withdrawal date is Friday November 9. Quizzes close at 11:59 pm on Saturdays unless otherwise specified on MyCourseLink.

Syllabus Quiz		Closes Sept. 22	
PART 1	FORM and FUNCTION		Mon–Tues
Lab 1	Field of Plant Biology Be prepared to go outside!		Sept. 10–11
Quiz 1		Closes Sept. 22	
Assignment 1	In lab activity		Sept. 17–18
Lab 2	Cells, Tissues, Mitosis, Meiosis		Sept. 17–18
Quiz 2		Closes Sept. 22	
Lab 3	Plant Organs (Stems, Roots, Leaves)		Sept. 24–25
Assignment 2	Distributed this week		DUE Oct. 3 at midnight
Quiz 3		Closes Sept. 29	
	Mandatory Attendance		Oct. 1–2
Lab 4	Practising the Scientific Method		Oct. 1–2
NO LABS	FALL READING WEEK		Oct. 8–12
PART 2	SURVEY of PLANTS and THEIR PREDECESSORS		
Assignment 3	In lab activity		Oct. 15–16
Lab 5	Cyanobacteria and Algae		Oct. 15–16
Quiz 4		Closes Oct. 20	
Lab 6	Non-Vascular Plants		Oct. 22–23
	SCIENTIFIC POSTERS DUE AT NOON ON FRIDAY OCT. 26		
Lab 7	Seedless Vascular Plants		Oct. 29–30
Quiz 5		Closes Nov. 3	
Lab 8	Seed Plants: Gymnosperms		Nov. 5–6
Lab 9	Seed Plants: Angiosperms		Nov. 12–13
Quiz 6		Closes Nov. 24	
Lab 10	Review lab		Nov. 19–20
Lab 11	FINAL LAB BELL RINGER EXAM		Nov. 26–27
BONUS	TO BE ANNOUNCED!		

d) Lecture topics for BIOL1130FA

Lecturer: TBD

Office: (contract staff not provided office space)

Email: TBD

Table 2: Proposed lecture schedule. Lectures are Monday, Wednesday, Friday at 12:30-1:30 pm. Students are responsible for ALL material in the chapters indicated. Fall term biology courses commence Tuesday September 4 and end Monday December 3 (INCLUSIVE). The final date to register is Monday September 17 and the final date for withdrawal is Friday November 9.

Week of:	Topics	Textbook chapters
Sept. 3	Introduction, Plant Cells	1, 3
Sept. 10	Mitosis, Tissues	3, 4
	Meiosis, Alteration Generations	12
Sept. 17	Roots and Soils	5
	Stems	6
Sept. 24	Stems, Leaves (intro photosynthesis)	6, 7
FRIDAY SEPTEMBER 28: MIDTERM 1		
Oct. 1	Classification	16
	Origin of Eukaryotes	17
	Selected Algae, Photosynthesis Intro	18
FALL READING WEEK, NO CLASSES OCT. 8-12		
Oct. 15	Bryophytes	20
Oct. 22	Bryophytes, Seedless Vascular	20, 21
Oct. 29	Seedless Vascular Plants	21
Nov. 5	Gymnosperms	22
WEDNESDAY NOVEMBER 7: MIDTERM 2		
Nov. 12	Angiosperms, Flowers, Fruits	8, 23
Nov. 19	Water in Plants	9
Nov. 26	Metabolism, Growth and Development	10,11
As per scheduling: FINAL EXAM		

Quizzes and Assignments are outlined in this lab manual. Adhere to due dates to avoid late penalties! Attending lectures and labs are the best way to keep up with course requirements.



e) Marking scheme

LECTURE:	MIDTERM 1	20.0%
	MIDTERM 2	20.0%
	FINAL EXAM	20.0%
LABORATORY:	POSTER (1)	12.5%
	FINAL BELL RINGER LAB EXAM (1)	10.0%
	ASSIGNMENTS (3)	7.5%
	MyCourseLink QUIZZES (7)	5.0%
PARTICIPATION:	iClicker quizzes (random!)	5.0%



Lecture tests MUST be written at the assigned date and time! These may be hard copy or via MyCourseLink (TBD). DO NOT SCHEDULE EVENTS or MAKE TRAVEL PLANS ON TERM TEST DATES OR DURING THE FORMAL EXAM PERIOD (including any contingency dates!) You may be asked to produce your student card at any time. Your IP address, time per question, exam start-stop times are recorded throughout ANY online exam.

Quizzes are administered via MyCourseLink. You have a sufficient number of days to complete each quiz so missed quizzes CANNOT be made up. You are allowed 10 attempts for each quiz, BUT you must attain a minimum score to earn each additional attempt (20% on attempt 1 to earn a second attempt, 30% on attempt 2 to earn third attempt, etc.) REVIEW MATERIAL BEFORE STARTING! Only your highest mark for each quiz is recorded. Aim for a perfect score! Quizzes are a great opportunity to test your knowledge of lab material! The style of quiz questions are similar to those on the bell ringer.



Assignments are given DURING the lab section for which YOU have registered. Assignments may vary between lab sections and may be due BEFORE you leave. Assignments cannot be made up. Due dates are strictly adhered to. Hand in assignments are assessed a 10% per day penalty.

Your individual **scientific poster** is worth a significant portion of your final grade. Content is based on a research experiment YOU CONDUCT during a lab. You MUST participate (attendance is taken!) A PDF copy of your poster is submitted on-line into a MyCourseLink Assignment box. Although experiments are conducted in groups, EACH STUDENT must submit an original presentation of their work. A marking rubric is posted. Review Lab 4 for additional details. The poster due date is strictly adhered to and late submissions are reduced by 10% per day (including weekends). MyCourseLink time stamps all submissions! **If you do not receive an email from MyCourseLink confirming your submission than assume we DID NOT RECEIVE IT!** All your activity on MyCourseLink is traced and available to course instructors.



The **bell ringer** exam is held during the last week of classes and is also a significant portion of your grade. You MUST write during your scheduled lab section. Your exact writing time will be posted at least 2 weeks prior to the exam.

Participation marks via iClicker remotes are randomly held during the labs and/or lectures. These assessments cannot be made up! Earning marks for another student or providing your

remote to another student to obtain marks for you is considered academic dishonesty! You may be asked to produce your student card at any time. Other Department of Biology courses use iClickers so your device can be used over several years. Forgetting your will clicker result in a grade of ZERO (0) for that session. Manual attendance checks are made by TAs throughout the term. Due to unforeseen technological issues and illness, your two lowest iclicker grades for the term will be dropped.

f) Grading policy

Tests and exams

- You **MUST** have your student ID available during all tests and exams. This includes lectures and labs.
- Having any online test or exam written by another student is a flagrant violation of the student code of conduct and will not be tolerated.
- The final bell ringer **MUST** be written in pen to be eligible for a remark. You must produce your student card when you enter.
- Drawing assignments may be done in pencil, but labels should be in ink.
- Electronic marking forms **MUST** be filled in using a soft lead pencil, enabling you to erase and correct any mistakes. The student must supply both pencil and a suitable eraser. See Fig. A.1 for an example.
- If you make a mistake on an electronic form that cannot be erased you must complete a new form! You should also circle answers on the test paper itself.
- There is **NO** penalty for incorrect answers, so guess!
- Exams papers **MAY NOT** be taken from the room. The electronic form is to be tucked inside the **COVER PAGE** of the exam. Ensure your name is on all pages.
- Lectures and labs are **NOT** separate courses; you are responsible for all material covered for **ALL** quizzes, tests, assignments, and the poster.
- Addition errors in marking are to be given to the lab technician for correction **THE SAME DAY** as they are handed back.
- If you feel you deserve additional marks for a question, be prepared to argue why! Submit your written argument to the lab technician for re-marking. **Warning:** Your **ENTIRE** paper will be remarked and your new mark may end up lower!
- If a quiz, assignment, test, poster or due date is missed, the lab technician or professor (lab or lecture, respectively) must be notified **IMMEDIATELY** before you will be **considered** for any “make up” test, quiz, or assignment! After initially notifying the instructor. A doctor’s certificate may be requested.



- Sleeping in, forgetting, or being “too busy” with other work DO NOT warrant consideration for a “make up” test, assignment, or quiz.
- The use of cell phones and other electronic devices (including smart watches, ear buds, calculators) are FORBIDDEN during written tests and exams. Please turn them off!
- The use of cell phones and other electronic devices (including smart watches, ear buds, calculators) are FORBIDDEN until you have handed in your paper and left the room. Please keep them off!
- Although the internet may seem like a good resource for online exams, tests, or quizzes, the time to research EACH question will not be enough to complete the assessment before the end time! STUDY! First year students seriously underestimate the amount of homework required AND amount of thinking necessary for “online” or “open book” exams! Prepare yourself! This includes iClicker quizzes!
- During paper exams/tests, ALL books, water bottles, and miscellaneous paraphernalia MUST be stored in sealed bags and stored UNDER THE DESKS; the desk MUST be cleared before quizzes and tests begin. THIS INCLUDES CELL PHONES and other smart devices. Do not remove ANY items from your bags until the time has ended, TAs have collected all papers or you have handed your paper to an invigilator, AND you have exited the room. Some iClicker quizzes may be closed book!
- For the lab bell ringer schedule will be posted outside the labs (grey cabinets) AND on MyCouseLink AND emailed to you. Your specific writing time occurs during your regular lab section. There will be NO conflict! Arrive 5 min early and line up outside CB3015.
- During the bell ringer all water bottles, jackets, brimmed hats, phones, smart devices, and extraneous materials MUST be stored in a closed bag on the back benches as instructed by TAs. YOU ONLY NEED A COUPLE PENS FOR THIS EXAM!! Valuables should never be left in the hallways. The department is not responsible for lost or stolen items. Leave valuables at home or in a locker.
- Reproduction (i.e. photocopying, taking pictures, making screen shots) of online quizzes, tests, or exams is strictly forbidden and is an infringement of copyrighted material.

g) Student conduct



With regards to your responsibility as a student, <https://www.lakeheadu.ca/faculty-and-staff/policies/student-related/code-of-student-behaviour-and-disciplinary-procedures> for Lakehead University students. These pages include information for Academic Misconduct and Sanctions.



Review the university policies for Student Examinations at <https://www.lakeheadu.ca/current-students/examination>.