Biology/Botany/Zoology 152 – Introductory Biology

GENERAL COURSE INFORMATION

Course Subject, Number, and Title

Biology/Botany/Zoology 152 – Introductory Biology

Credits *5*

Canvas Course URL

https://canvas.wisc.edu/courses/371795

Course Designations and Attributes

General education; Honors available.

Course Description

This is the second semester of a two-semester course designed for majors in biological sciences. It is a continuation of Introductory Biology 151. Topics include: a survey of the five major kingdoms of organisms, speciation and evolutionary theory, selected topics in plant physiology, and ecology at multiple levels of the biological hierarchy.

Requisites

Biology/Botany/Zoology 151

Introductory Biology 152 is a Communications-B course.

Comm-B courses are expected to develop advanced skills in:

- critical reading, logical thinking, and the use of evidence;
- the use of appropriate style and disciplinary conventions in writing and at least one other mode of communication relevant to the discipline;
- the productive use of core library resources specific to the discipline.

Meeting Time and Location

Lecture: 12:05-12:55pm MWF – 2340 Mosse Humanities Building

Discussion and lab meeting times and locations depend on section enrollment and are posted on My UW enrollment as well as on the course Canvas site.

Instructional Mode

In-person

Credit Hours are met by the Course

This 5-credit class meets three times weekly for 50 minutes for lecture, once weekly for three hours for lab, and once weekly for 75 minutes for discussion. Over the course of the semester, students are expected to do a total of about 225 hours of learning activities, including class attendance, lab attendance, reading, studying, preparation, problem sets, writing, and other relevant work. Work for Intro Bio 152 outside of the classroom is expected to take approximately nine hours per week.

Regular and Substantive Student-Instructor Interaction

This course meets the regular and substantive student-instructor interaction requirement through feedback on student work, providing information about course content, facilitating discussion of course content, and through predictable and scheduled interactions with the student.

INSTRUCTORS AND TEACHING ASSISTANTS

Instructors - Titles and Names

Dr. Kate McCulloh	**Dr. Prashant Sharma**	**Dr. Sara Hotchkiss**
324A Birge Hall	441 Birge Hall	353 Birge Hall
kmcculloh@wisc.edu	psharma37@wisc.edu	shotchkiss@wisc.edu

Instructor Availability

Student help sessions with the faculty will be held weekly both in person and via Zoom. Times and locations will be posted on the course Canvas site.

Teaching Faculty

Jon Breschak	**Dr. Sarah Edlund**	**Kerry Martin**
235 Noland Hall	231 Noland Hall	232 Noland Hall
(608) 262-1616	(608) 265-8523	(608) 262-3599
jon.breschak@wisc.edu	sedlund@wisc.edu	kerrymartin@wisc.edu

Questions about the course should be directed to our class email address: 152lec1@zoology.wisc.edu

Teaching Assistant Information

A list of all TA names, student help session times, and contact information will be provided on the course Canvas site.

Course Website, Learning Management System, and Instructional Tools

Everything you need for the course will be posted on the course Canvas site (listed above), which is organized into weekly modules. Each weekly module is divided into different pages: one for lecture, lab, discussion, and weekly announcements. Each page contains all the information needed for that week. For example, the weekly lecture page will contain the slides and video recordings from lecture for that week of class.

LEARNING OUTCOMES

Course Learning Outcomes

Introductory Biology 151/152 is a two-semester introductory sequence for majors in the biological sciences. Emphasis will be placed on learning, understanding, and being able to use key biological concepts and the scientific method.

The study of modern biology is not only a matter of assimilating information. Learning how to use that information for problem-solving, posing hypotheses, and interpreting experimental results is also critical to understanding biology as a science. The lectures examine key concepts. Discussion all you to investigate these more fully. In the laboratory, you will need to use the scientific method and apply concepts from lecture to carry out the various activities. In addition, labs stress the development of written and oral presentation skills. These are required to successfully communicate scientific concepts and your research findings to others.

General Learning Goals and Objectives

- Develop a broad knowledge base sufficient to understand, connect, and synthesize the Vision & Change core concepts: Evolution; Structure and Function; Information Flow, Exchange, and Storage; Pathways and Transformations of Energy and Matter; Systems.
    - Students will be exposed to topics that cover the breadth of the field of biology, the scope of biology (atoms to ecosystems), and about the many ways to be a biologist.
- Make connections to other scientific disciplines. Students will:
    - use other scientific disciplines (e.g., chemistry, physics, and math) to understand biology, and make conceptual and content linkages with those disciplines.
    - understand the importance of collaboration between biology and other scientific disciplines.
- Make connections to society at large. Students will understand:
    - the scientific underpinnings of current issues.
    - why biological knowledge is essential to global citizenship.
- Develop practical skills necessary for a professional biologist. Students will advance their:
    - teamwork skills.
    - laboratory skills.
    - quantitative analysis skills.
- Develop communication proficiency. Students will be able to:
    - write logically and with clarity and style about important questions in biology.
    - articulate persuasively, both orally and in writing, focused, sophisticated, and credible arguments.
    - understand and explain results effectively.
    - approach evidence with probity and intellectual independence.
    - find and use source material appropriately with proper citation.
    - read and understand primary scientific literature.
    - understand the difference between primary and secondary scientific literature.
- Become proficient in problem-solving through engaging in the process of science. Students will become proficient in:
    - developing testable hypotheses and aligning methods with a hypothesis.
    - using biological knowledge/concepts to solve novel problems.
    - identifying/asking questions and determining how to answer them.
    - integrating disparate information.

- Gain interest in the field of biology. Students will gain an appreciation for all topics in biology, not just their own intended major or career path.

GRADING

Grade Distribution

Attendance in lecture, lab, and discussion is mandatory for this 5-credit course. Students must complete all major components and assignments for the course to receive a passing grade in the class.

- The lecture portion of the course will comprise 50% of the final grade.
    - 47% will come from three equally weighted exams. There is no cumulative final for the course.
    - 3% will come from in-lecture Top Hat questions. You are required to respond to questions using the Top Hat app on your device or through the Top Hat website each day during lecture to receive credit. Each daily score will be based on participation (all questions) and correctness (for those questions with a correct answer that we expect you to know at the time of asking). You must be present in the lecture room to see and respond to the questions; however, to accommodate absences from lecture due to illness, emergency, technical issues with the app or your device, or other unforeseen situations, we will drop the lowest 20% of your daily scores. For more details on how we calculate your final score, see the Top Hat explanation page on Canvas.
- The lab and independent project will comprise 40% of the final grade.
- The discussion will comprise 10% of the final grade.
    - 7% will come from online discussion quizzes.
    - 3% will come from weekly discussion homework and from activities completed during discussion.

Grading Scale

The course is graded on a standard scale as noted below.

90-100% = A
88-89.99% = AB
80-87.99% = B
78-79.99% = BC
70-77.99% = C
60-69.99% = D
0-59.99% = F

Canvas calculates your grade in the course using ONLY assignments that you have completed. This means that as more assignments are completed, both the numerator and denominator of your grade calculation continue to grow and become more reflective of your final score. Please take into consideration that assignment groups in this course are weighted differently and that large fluctuations in your grade may occur as new scores are entered into the respective groups.

Please note that our course is NOT graded on a curve. A curve could result in lower grades across the entire course if we did so. Also, please note that we do NOT round scores up.

Credit for Late Work

There is no deduction for late lab and discussion work, if the late submission is excused and arranged in advance; or, in case of illness or emergency, as soon as possible thereafter. Contact your TA as soon as you can to set up an alternative submission time.

For unexcused late work (i.e., for unexcused absences or late submissions)

- Lab
    - There will be no credit for late pre-lab assignments.
    - For other lab assignments:
        - 10% deduction per day, up to 50%
        - For assignments that are more than 5 days late, you may still submit them for 50% credit at any point during the semester, until December 13th. After that, there will be no credit for late submission.
- Discussion
    - There will be no credit for late homework or quizzes.
    - For in-class activities and other discussion assignments:
        - 10% deduction per day, up to 50%
        - For assignments that are more than 5 days late, you may still submit them for 50% credit at any point while still in the current lecture module for the Plant Biology and Evolution modules (e.g., you can submit Plant Biology in-class discussion assignments until the Plant Biology exam date), or until December 13th for the Ecology module. After that, there will be no credit for late submission.

Questions Regarding Graded Work

Any questions regarding grading of any exams, quizzes, or assignments must be addressed with the grader within one week following the return of the graded work. The grader reserves the right to address only the graded item in question or the entire exam, quiz, or assignment. Absolutely no reconsideration of graded work will be permitted following the submission of final letter grades in this course unless it concerns a technical issue regarding grade recording.

REQUIRED TEXTBOOK, SOFTWARE, and OTHER COURSE MATERIALS

Textbooks & Other Required Materials

1. ***Biology – How Life Works 3rd edition***, by Morris, Hartl, Knoll, Lue, & Michael. You can purchase an access code to an electronic copy of the textbook at the University Book Store (UBS), for a special price exclusive to UW Intro Bio students. It will give you 24 months access. You will also be able to download the pdf for four years after purchase.
    - Here's the specific information:
        - Package Title: ACHIEVE FOR BIOLOGY: HOW LIFE WORKS
        - Author: Morris
        - Package ISBN: 9781319478063
2. **Top Hat**. You must have a device (phone, tablet, or laptop) that can access the internet and run Top Hat. If you do not have such a device, please contact us. We will work with you to find a solution.
3. You do not need to purchase a lab manual. All lab materials will be provided through Canvas.

Lecture Readings, Weekly Announcements, and Course Emails

Lecture reading assignments will be posted on each Canvas lecture page. You should read these assignments ***before*** attending lecture. You are also responsible for all information that is posted in Announcement on Canvas, though we will assume you have one week to read it. These announcements might include essential information regarding homework, course policies, exam scheduling, and other matters. Other notifications about the course will be via email. All students are responsible for the information contained in these communications and are expected to check them regularly. If you have any difficulty doing so, contact us immediately.

EXAMS

Exam Schedule

Exam 1 – Plant Biology	Wednesday, October 11th	8:15-9:45pm; See Canvas for location
Exam 2 – Evolution	Thursday, November 9th	8:15-9:45pm; See Canvas for location
Exam 3 – Ecology	Monday, December 18th	7:25-8:55pm; See Canvas for location

Exam Review Schedule

Exam 1 Review – Plant Biology	Monday, October 9th	8:15pm; 3650 Humanities
Exam 2 Review – Evolution	Wednesday, November 8th	8:15pm; 145 Birge
Exam 3 Review – Ecology	Date, time, and location TBD	

Exam locations will be announced in class and posted on Canvas prior to each exam.

Exam Policies

- **Conflicts between our course and other courses' exams:** University policy specifies that exams cannot disrupt classes held during regularly scheduled times. If you have an exam for another course that conflicts with your lab or discussion in Intro Bio 152, you must request an alternate exam time from your professor (https://registrar.wisc.edu/exampolicy/). Likewise, we will provide alternate exam times for students with legitimate course conflicts of this nature.
- **Alternate exam times** will be offered prior to each exam for students with documented course conflicts.
- **No Electronic Devices** (including phones or calculators) will be permitted in the exam rooms. Any math required will involve simple calculation performed by hand.
- **Notecards** will be permitted in the last half of exam sessions. Blank cards will be provided approximately one week prior to the exam. All information on the card MUST be written by hand (i.e., not from a printer).
- There will be **no late make-up exams** except for extreme cases, such as a death in the family, serious illness, legal, or University-related conflicts. The format of the make-up exam will be at the professor's discretion. Contact the teaching faculty for scheduling. This policy also applies to any other graded instrument of the course.

ARTIFICIAL INTELLIGENCE (AI) USE

Submission of any papers, paper drafts, or any other course assignments that were wholly or partially written by AI tools (including, but not limited to, ChatGPT, DALL-E, and others) does not support the learning

objectives of this course and is prohibited, and will be addressed through UW–Madison's academic misconduct policy (https://conduct.students.wisc.edu/academic-misconduct/#process), specifically UWS 14.03(1)b (b) Uses unauthorized materials or fabricated data in any academic exercise.

HONORS

The Honors option for this course is still in development. It will include additional contact with the lecturing faculty throughout the semester. Updates will be posted on Canvas and information will be shared directly with students enrolled in the Honors option as soon as possible.

To register for this course for Honors or to drop the Honors credit, please visit the following site for directions: https://honors.ls.wisc.edu/add-or-drop-honors/

PRIVACY OF STUDENT RECORDS & THE USE OF AUDIO RECORDED LECTURES STATEMENT

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in this course may use the materials and recordings for their personal use related to participation in this class. Students may also take notes solely for their personal use. If a lecture is not already recorded, you are not authorized to record the lectures without the instructor's permission unless you are considered by the university to be a qualified student with a disability requiring accommodation. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities. Students are also prohibited from providing or selling their personal Page 8 of 10 notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

COURSE EVALUATIONS

Students will be provided with an opportunity to evaluate this course and their learning experience. Student participation is an integral component of this course, and your confidential feedback is important. You are strongly encouraged to participate in the course evaluation.

STUDENTS' RULES, RIGHTS & RESPONSIBILITIES

See the Guide's to Rules, Rights, and Responsibilities

DIVERSITY & INCLUSION

Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

ACADEMIC INTEGRITY

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously

listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary action include, but is not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion. For more information, refer to https://conduct.students.wisc.edu/academic-misconduct/student-resources-for-academic-integrity/.

ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES STATEMENT

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (UW-855) require the university to provide reasonable accommodations to students with disabilities to access and participate in its academic programs and educational services. Faculty and students share responsibility in the accommodation process. Students are expected to inform faculty [me] of their need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to provide reasonable instructional and course-related accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. (See: McBurney Disability Resource Center at www.mcburney.wisc.edu)

ACADEMIC CALENDAR, RELIGIOUS OBSERVANCES, & ELECTION OBSERVANCES

Students must notify the Teaching Faculty and their TAs within the first two weeks of class of specific days or dates on which they request relief from course requirements for religious observances or election official responsibilities. Please visit the University website for further information regarding the Academic Calendar & Religious Observances.

ABOUT YOUR INSTRUCTORS

Dr. Kate McCulloh – Plant Biology

I mostly grew up in Manhattan, Kansas. After high school I was convinced that I didn't want to ever go to college, which horrified my parents. My mom filled out my college application and after a semester of traveling with a friend, I decided to give it a try. As it turns out, I loved it and haven't left since. After about a year of indecision about a major, I settled on biology and one of the professors in the second semester intro sequence changed my life. He was a wonderful teacher that had extremely high expectations of his students and used humor to draw students in. I ended up working in his lab on CAM plants (we'll learn about those this semester), and decided to get a graduate degree in the same general area I had been working on with him (called eco-physiology). I finished my B.S. in Ecology and Systematics at the University of Kansas and then started a PhD program at Duke University. About a month after starting at Duke, the professor I was working with announced that he would be moving to the University of Utah the following spring, and I decided to follow him and continue to work with his group. For my PhD and in the years that have followed I have studied long-distance water transport in plants (we'll also learn about this!). I am particularly interested in the mechanisms of how plants tolerate or resist drought stress. As an eco-physiologist, I study the physiology of the whole plant (as opposed to the cellular level) and ask questions from an ecological perspective. I mostly work on woody species (trees, shrubs and woody vines), and I work on individuals that range in size from tiny little seedlings to 60+ m tall trees. My work has taken me to some beautiful old growth forests in the Pacific Northwest and Panama, as well as Ecuador, Poland, New Mexico, Utah, and Pennsylvania.

I'm really looking forward to an exciting time this semester. I know plants aren't viewed to be as thrilling as other aspects of biology, but I think if you give them a chance, you might be surprised at how cool they really are! They've found very different solutions to many of the same problems that animals deal with—acquiring energy, growth, reproduction, and evading predators. Plus, they turn air and sunlight into sugar—that's amazing!

Dr. Prashant Sharma – Evolutionary Biology

Since elementary school, I was that person who always flipped over rocks to see what bugs were hiding under them. I grew up in the outskirts of Boston, Massachusetts, and stayed near home through college and graduate school. I was certain at one point that I wanted to go to medical school, but I ended up in an invertebrate biology lab for a work-study program during college. During that time, I traveled with the lab to Sri Lanka to collect bugs, described new species, and went on my own to New Caledonia (an old island in the Pacific Ocean off the coast of Australia) during my gap year after college. Sometime in the middle of that trip, I became certain that I wanted to become a biologist! My fieldwork in my graduate school years took me to Southeast Asia (Laos, the Philippines, and Palau) and the Southwest Pacific (New Caledonia, Fiji, Vanuatu, Micronesia, and Australia).

I completed my postdoctoral fellowship at the American Museum of Natural History. It's a great place to work with museum collections and for diversity discovery (contrary to the 2006 film "A Night at the Museum," though, the dinosaurs don't come to life at night…). I joined the faculty of the University of Wisconsin-Madison one year ago. My lab works on the diversity of arthropods, the evolution of development (evo-devo), and the evolution of terrestrialization. Our "zoo" includes colonies of daddy-long-legs, spiders (two kinds!), scorpions, centipedes, crickets, milkweed bugs, and amphipod crustaceans. Let us know if you would like a tour!

Dr. Sara Hotchkiss – Ecology

To be added soon!

Intro Bio 152 - Fall 2023 - Lecture and Exam Schedule				
Date	**Day**	**Lecturer**	**Topic**	**Required Reading**
Sep 6	W	McCulloh	Origin of land plants	26.5 (pg. 583), 28.1 (pgs. 617-618)
Sep 8	F	McCulloh	Invasion of land and Bryophytes	27.1 (pgs. 591-592), 28.1 (pg. 619)
Sep 11	M	McCulloh	Vascular plants	28.1 & 28.2 (pgs. 620-625)
Sep 13	W	McCulloh	Angiosperm reproduction	28.3 (pgs. 626-634)
Sep 15	F	McCulloh	Plant form and growth	29.1 (pgs. 639-641), 29.3 & 29.4 (pgs. 648-654)
Sep 18	M	McCulloh	Phototropism and senescence	29.5 (pgs. 654-656)
Sep 20	W	McCulloh	Leaf structure and function	*No new readings*
Sep 22	F	McCulloh	Photosynthetic pathways	27.2 (pgs. 597-600)
Sep 25	M	McCulloh	Cellular water relations	2.3 (pgs. 35-36)
Sep 27	W	McCulloh	Stomatal control and responses	27.2 (pgs. 595-597)
Sep 29	F	McCulloh	Stem structure and function: water transport	27.3 (pgs. 601-605)
Oct 2	M	McCulloh	Stem structure and function: metabolite translocation	27.4 (pgs. 606-608)
Oct 4	W	McCulloh	Root structure and function: mineral nutrient acquisition	27.5 (pgs. 608-612)
Oct 6	F	McCulloh	Plant adaptations to the environment	*No new readings*
Oct 9	M	Sharma	What is evolution?	*No new readings*
		Exam 1 Review - 8:15pm; 3650 Humanities		
Oct 11	W	Sharma	History of evolutionary thought	**No required reading;** *Optional: Wallace, A.R. (1855), posted on Canvas*
		Exam 1 - 8:15-9:45pm; see Canvas for locations		
Oct 13	F	Sharma	Hardy-Weinberg equilibrium	20.3
Oct 16	M	Sharma	Evolutionary mechanisms I: genetic drift	20.5-20.6
Oct 18	W	Sharma	Evolutionary mechanisms II: genetic variation	20.1-20.2
Oct 20	F	Sharma	Evolutionary mechanisms III: natural selection	20.4
Oct 23	M	Sharma	Speciation and adaptative radiation	21 (all)
Oct 25	W	Sharma	Classifications, phylogenies, and tree thinking	22 (all)
Oct 27	F	Sharma	History of life on Earth	24.1, 24.4-24.5
Oct 30	M	Sharma	Prokaryotic evolution	25.2-25.3
Nov 1	W	Sharma	Animal diversity	Skim chapter 42
Nov 3	F	Sharma	Human evolution	23 (all)
Nov 6	M	Sharma	Evolution and developmental mechanisms	19.2-19.5
Nov 8	W	Sharma	Conclusions	*No new readings*

Nov 8	W	**Exam 2 Review - 8:15pm; 145 Birge**		
Nov 9	Th	**Exam 2 - 8:15-9:45pm; see Canvas for locations**		
Nov 10	F	Hotchkiss	Ecology and biodiversity: global patterns	47.3, 48.5, 48.6, Case 8: 944-946
Nov 13	M	Hotchkiss	Climate and biomes	47.1, 47.2
Nov 15	W	Hotchkiss	Biotic factors, history, behavior, dispersal: why isn't everything everywhere?	45.1, 48.2, 48.4
Nov 17	F	Hotchkiss	Local factors and changes in time	44.1, 44.2 (looking ahead)
Nov 20	M	Hotchkiss	Populations, limits, and life history tradeoffs	44.3, 44.4
Nov 22	W	Hotchkiss	Metapopulations and human populations	44.4, 48.1
Nov 24	F	**Thanksgiving Recess - No lecture**		
Nov 27	M	Hotchkiss	Behavior: foraging and coping with the neighbors	43.1, 43.6
Nov 29	W	Hotchkiss	Reproduction and interactions among species	45.2, 45.3
Dec 1	F	Hotchkiss	Community structure and biodiversity	45.4 (998-1001), 48.4 (review)
Dec 4	M	Hotchkiss	Disturbance, succession, and biodiversity	45.4 (1001-1005)
Dec 6	W	Hotchkiss	Matter and energy: primary production and bioaccumulation	46.3, VS 12 (1029)
Dec 8	F	Hotchkiss	Biogeochemical cycles	46.1-2, 46.4-5, 48.3
Dec 11	M	Hotchkiss	Landscape ecology: edges, corridors, and fragments	TBA
Dec 13	W	Hotchkiss	Restoring the future	TBA
		Exam 3 Review - date, time, and location TBD		
Dec 18	M	**Exam 3 - 7:25pm-8:55pm; locations TBD**		

152 Schedule of Labs - Fall 2023				
Week	**Topic**	**Lab assignments due**	**Points**	**IP Assignments due**
Sept 4-8	**Labs begin Monday, September 11**			
Sept 11-15	Independent Project (IP) (1 of 3)	Pre-lab quiz: Intro to Lab and the IP & Pre-lab quiz: Discussion & Lab policies	3	
Sept 18-22	Independent Project (2 of 3)	Pre-lab: Data extraction worksheet	3	IP type selected & partners found, if necessary - by the end of your lab
Sept 25-29	Independent Project (3 of 3)	Pre-lab: Complete your row of the Student IP Info Spreadsheet		Know your research question and variables by the time your lab beegins Complete IP info spreadsheet before your lab meets
		Pre-lab: Complete library module		
		During lab: In-class outline worksheet	6	
Oct 2-6	Plant Biology: Tropisms (1 of 3)	Pre-lab: Tropisms worksheet and IP outline	3	
		During lab: Experimental design worksheet	10	
Oct 9-13	Plant Biology: Tropisms (2 of 3)	Nothing due this week		
Oct 16-20	Plant Biology: Tropisms (3 of 3)	Pre-lab: Stats worksheet	10	First draft & data spreadsheet - Monday 10/16, 5pm
Oct 23-27	Evolution (1 of 2)	Pre-lab: Final Tropisms paper	45	
		Pre-lab: Tree thinking worksheet	6	
Oct 30-Nov 3	Evolution (2 of 2)	Pre-lab: Evolution 1 worksheet	10	
Nov 6-10	Water Quality (1 of 2)	Pre-lab: Evolution case studies worksheet & slides	10 & 8	
		Pre-lab: Water quality and ecology worksheet	5	
		During lab: Data collection submission	3	
Nov 13-17	Water Quality (2 of 4) Poster Workshop (1 of 2)	Pre-lab: Water Quality and Madison	4	Second draft of full paper - Monday 11/13, 5pm
		During lab:Water Quality data analysis worksheet	10	
Nov 20-24	**Thanksgiving Recess - No labs**			

Nov 27-Dec 1	Water Quality (3 of 4) Poster Workshop (2 of 2)	Pre-lab: Chloride worksheet	4	Final draft due to mentors (Friday 12/1, noon); Electronic version of poster (24 hours after your lab ends)
		During lab:Water Quality chloride case study worksheet	8	
Dec 4-8	Water Quality (4 of 4)	During Lab: Water Quality Communication worksheet	6	IP peer review (during lab): Attend your assigned session of the Poster Symposium
	Poster Symposium: Wednesday December 6th Session A is from 3:00-4:30 pm, (Set up starts at 2:30, doors open to the public at 3:00) Session B from 5:30 to 7pm. (Set up starts at 5:00, doors open to the public at 5:30)			
Dec 11-15	**No Labs - Lecture and discussion sections will still meet**			Final paper - Monday 12/11, 5pm Recorded presentation - Wednesday 12/13, 5pm