

PLANTS, ENVIRONMENT, AND SOCIETY

BIO 194 – Spring 2020 - Macalester College

Plants, Environment and Society (PES) is a newly created course, offered for the first time this semester. During this time together, we will learn about what makes plants plants, and how plants have shaped the Earth through environmental interactions. We will also dig into the 'society' aspect and learn about how plants have been cultivated by humans around the world, and how plants shape our worlds. I am a plant biologist, and I will be presenting this class through a biological perspective. We will cover basic plant biology and ecology prior to diving into topics including agriculture, climate change, urban ecology, and commercial biodiversity. We will mix science with personal interests, read books, practice our writing, and present our ideas to peers in small groups and for the whole class. This class welcomes diverse perspectives on our experiences with plants and will emphasize environmental justice, and what that looks like locally and globally.

COURSE INFORMATION

- **Instructor:** Prof. Mary Heskell (she/hers); mheskel@macalester.edu
- **Class:** MWF 2:20-3:20 PM; Theater 203
- ***Student* Hours:** W 9-10:30AM in OIRi 220; F 3:30-5PM in Smail Gallery
- **Texts:** Braiding Sweetgrass by Robin Wall Kimmerer, PhD; VSI: Plants by Timothy Walker, PhD. All other readings will be available via Moodle.

Email Policy: I aim to respond to emails between 9AM-5PM on weekdays; emails received after 5PM will be answered the following morning. I often cannot answer emails over the weekend, so plan accordingly. Many topics may be answered more easily in person, and we will devote time in class each day to answering questions.

Class Meetings & Attendance:

- You are expected to attend every class. If you are unable to attend class for an academic (ie - a field trip for another class) or personal (your discretion) reason, please email Mary **before** that class meeting. For each unexcused absence, your overall course grade will decrease by 1.5% (ie – if you have a 90 and miss 2 classes → 87, and so on).
- You are responsible for emailing class groups/partners if we are working in groups that day, and making up materials via moodle, office hours, or classmate meetings.

Late work policy/NQA:

- Assignments are expected to be turned in on the assigned date and time.
- Everyone is granted **one** "no questions asked" (NQA) 4-day extension on an assignment. To use this, email Mary within 24hr before the deadline that you are applying your NQA extension for 4 extra days. This does not apply to presentations.

Developing your voice and being a team member: Science requires a balance of confidence and humility – this is as true for undergraduates as it is for researchers at leading institutions. We will need confidence to pursue and develop new ideas and approaches, to thoughtfully critique ideas, and to follow your curiosity. Science also requires humility and patience - with yourself, others, and the material. Individually, in groups, and as a class, we will identify our limitations, ask for help and guidance, listen to thoughtful, appropriate criticism from others, and reflect on our improvement and setbacks. As you develop your thoughts and opinions in this class, be mindful that we are also collectively creating an open, accepting community of learning and growth.

LEARNING GOALS

Plants are integral to earth and human social systems, but their biology is not heavily emphasized in undergraduate curriculum. In this class, we will focus on the biology of plants, and how their forms and functions shape the world we live in. This class will also be a place to work on science communication skills, including visual and oral presentations, and writing for scientific and broad audiences. We will also work on reading and interpreting primary literature, data, and graphs with regularity.

- Work productively in groups and create supportive, effective communities based on open communication, engagement, and sharing of responsibilities.
- Discuss and critique primary literature
- Build a community of learning where challenges are met with thoughtful, open discussion and collaboration
- Consider and integrate Environmental Justice issues into environmental and ecological data analysis
- Interpret graphs of data and apply findings to new scenarios
- Make and test hypotheses based on data collection
- Discuss your ideas in small and large group settings
- Connect plant metabolism from the cell to global scales
- Apply biological knowledge to current events
- Research and describe how plant commodities have shaped communities through history, with a focus on underrepresented voices
- Quantify biodiversity using different metrics and approaches
- Connect biological and ecological processes to current events

ASSESSMENTS

Plant Love Story – Based on the blog “Plant Love Stories” (<https://www.plantlovestories.com/>), this assignment asked you to write a short, first person vignette about how a plant (species, individual, idea, etc) has impacted you. The format is loose but should be between 400-500 words. You are open to submit yours to the website after sharing in class.

Book Club – We will read “Braiding Sweetgrass” as a class, and some other selected chapters and maybe a podcast! For five classes during the semester, we will discuss the chapters and readings in small and large groups. Prior to discussions, short writing responses (400 word) to prompts will be submitted via moodle.

Discussions – Discussions will occur in large and small groups through the semester and be based on readings. Prior to the discussion day, you will submit a writing response to a prompt on moodle. Grades will be based on participation, prompt response, and in-class writings.

Big Quizzes – Like a small exam, Big Quizzes will occur two times during the semester and gauge your understanding of basic plant processes (Weeks 1-4 on BQ1) and applied concepts (Weeks 5-6, 10-11 on BQ2). BQs should take 45-55 minutes to complete and will be held in class.

Fascination of Plants Reports & Presentations – This class cannot possibly cover everything about plants. The Fascination of Plants assignment provides an opportunity for you to get credit for your learning. Choose a topic of interest, inspired by media, reading, or experience, and examine it with more rigor. Presentations will be 5 minutes long, reports 750 words and require peer-reviewed references. Details on Moodle.

Day Without Plants Challenge – As a class, we will challenge ourselves to go a day without plants. If this will pose a health issue, just *imagine* and take of every plant you did not use. Short write up about your experience (400 words).

Complex Commodities Report and Presentations – In small groups (2-3), students will select a staple crop from a list and examine this plant through many perspectives. The presentations will be 10 minutes long, and be done in groups; the report will be the major independent assessment of the semester. Both will examine the biology, ecology, history, economy, trade, cultivation, and environmental justice and inequity issues around this species.

Biodiverse Menus Report – We will quantify the biodiversity of various menus from Café Mac and other restaurants and grocery stores near campus. In small groups, biodiversity will be compared based on hypotheses made about the offerings. Group reports on this assessment will describe and summarize results.

COURSE ASSESSMENTS / GRADING

Assessment	Due	Points	%
Plant Love Story	Feb 3	50	5%
Book Club	5x through term	25 each (125 total)	12.5%
Discussions	3x through term	25 each (75 total)	7.5%
Big Quizzes	Feb 21, Apr 22	2 x 150 = 300	30%
Fascination of Plants Report	Feb 28	100	10%
Fascination of Plants Mini Presentation	Feb 28	50	5%
Day without Plants Challenge	Mar 11	25	2.5%
Complex Commodities Presentation (Group)	Mar 30; Apr 1	7.5	7.5%
Complex Commodities Report	Apr 10	150	15%
Biodiverse Menus Report (groups)	Apr 15	50	5%
	Total Points	1000	100%

Week: Topic	Monday	Wednesday	Friday
Welcome!			1/24 Germinating our class
1: Life on Earth	1/27 What are Plants anyways?	1/29 Eating the Sun	1/31 Book Club
2: Leaves	2/3 Photosynthesis Plant Love Story due	2/5 Photosynthesis 2	2/7 CAM & C4 Photosynthesis
3: Roots/Stems: Water & Nutrients	2/10 Global Photosynthesis	2/12 Roots	2/14 Book Club
4: Applying ideas	2/17 Stomata & CO ₂ , and transpiration	2/19 Measuring stomata Activity worksheet	2/21 Big Quiz 1
5: Agriculture & the Environment	2/24 Work on FoP & watch doc	2/26 Local & Global Agriculture	2/28 Discussion (Ziske paper)
6: GM Technology	3/2 Fascination of Plants Mini-Pres & Reports	3/4 What is GM? & Golden Rice	3/6 Discussion
7: Complex Commodities 1	3/9 Plants as Commodities	3/11 Day without Plants! Overview of Projects & Group Selection	3/13 Book Club
SPRING BREAK (3/14-3/22)			
8: Siberia Break!	Mary in Siberia		
9: Complex Commodities 2	3/30 Presentations Day 1	4/1 Presentations Day 2	4/3 Book Club
10: Biodiversity on the plate	4/6 Making hypotheses about our diets	4/8 Quantifying Biodiversity & Making trees	4/10 Testing hypotheses Complex Commodities Reports Due*
11: Forest Fires & Environmental Justice	4/13 Amazonia	4/15 Australia & Indonesia Biodiverse Menus Report due	4/17 Book Club
12: Urban Green Spaces	4/20 Urban Ecosystem Services	4/22 Big Quiz 2	4/24 Discussion
13: Urban Green Spaces	4/27 Quantifying ES in a city	4/29 Project: Planning the Green Space	5/1 Presentations: Where is the next park?
14: Can plants save the world?	5/4 Final Class / Course Surveys		