Assignments

Monday 31 August -- Meet in front of Science Building. Bus will leave at 1 pm. Don’t be late!

Activity: Introduction to the Conard Environmental Research Area (CERA)

Movie: America's lost landscape: the tallgrass prairie (DVD in Burling listening room)

Readings: Chapter 1 of Konza Prairie
          Chapter 1 of Biological Science
          Guide to flowering plant morphology (Handout)
          Common plant families of the prairie (Handout)
          Investigations pp. 21-24 (Keeping a lab/field notebook)

Focus questions:

1. What factors influence the distribution of different types of prairies and savannahs in central North America? How are these ecosystems distinguished from others?
2. Why are plants (and other organisms) organized into taxonomic groups? On what bases can you distinguish between various common plant families of the prairie? Why are such features good indicators of phylogenetic relationships?
3. What are some features of good hypotheses? What are some features of good scientific tests of these hypotheses?

Wednesday 2 Sept -- Meet at Science Building. Bus will leave at 1 pm. Don’t be late!

Activity: Vegetation Sampling at CERA

Reading: Undertaking Investigations – pp. 7-11 of Investigations manual
          An introduction to sampling: Vegetation analysis of prairies (Handout)
          BRING YOUR Wildflower GUIDE TO CLASS!

Focus questions:

1. What is the role of description in scientific investigations?
2. What is a sample and why is it important?
3. How would you distinguish between haphazard, random and systematic sampling methods?
4. Under what circumstances would each be used?

Friday September 7 Meet in Science 1822 for lecture/discussion.

Reading: Chapter 2 of Konza Prairie – A Tallgrass Natural History
          pp. 481-502; 548-553 in Biological Science

Focus questions:

1. What is the origin of limestone deposits and what can they tell us about the history of an area? How do paleoecologists reconstruct ancient communities for times when erosion was more common than deposition? What are the limitations of the fossil record?
2. How has the speed of climate change influenced the make-up of biological communities at Konza?
3. What were the impacts of humans on prairie communities? Why were they relatively large?
4. Describe the logic behind the three required components of natural selection. Make sure you can identify each component in the two case studies (Mycobacterium, finches).
5. Why is evolution said to have no “goal”? Why aren’t all traits adaptive?
Assignments

Sunday September 6th Special Sunday Field Trip to Local Prairie Remnants
Leave the Science building at 9 AM. Back by 3 PM. Morning muffins and lunch provided.

Activity: Field Trip to local prairie remnants and Prairie Learning Center – BRING YOUR FIELD GUIDE AND NOTEBOOK

Readings (download class webpage):


Drobney, P. The phoenix people of sod corn country.

Focus questions:

1. What are some of the difficulties in determining what "pre-settlement" conditions in Iowa were? Should ecological restoration depend on our knowledge of pre-settlement conditions?

2. Why does Smith argue (on p. 106) that the goal of restoration espoused by Sayen is impossible for Iowa prairies? How would you describe the differences in values between the agricultural systems that broke the prairie, the educational and governmental systems that saved a tiny bit of prairie earlier in the century, and the groups working to bring back prairies now? What factors contribute to these differences? Is there a way to forge a compromise between these different values?

Monday September 7th – Vegetation sampling at CERA– leave at 1 pm from Science building. No reading assignment.

Wednesday September 9th -- Data analysis and discussion of scientific paper styles
Class will start at 1:15 in Science 1823.

Readings:
• Investigations pp. 12-20 (“Data analysis and presentation”), pp. 24-33 (“The Scientific Paper”), and pp. 41-44 (“Summary statistics”)
• Howe, H. 1999. Response of Zizia aurea to seasonal mowing and fire in a restored prairie. American Midland Naturalist 141:373-380. [see link on Web page to download]

Read the paper style guidelines before reading Howe's paper. Did he follow these guidelines? Analyze the structure of each section of the paper. How did the author structure the introduction? The discussion? Does his use of structure help his arguments? What might improve the paper?

Friday September 11 -- Activity: Discussion of scientific papers. Meet at 1:15 in Science 1823.

Individual Assignment: Choose one of the papers from Tillers to read (see link on class web site). Consider whether the authors have followed the directions in Investigations. Come prepared to describe and discuss the paper you have read.

Group assignment: Each group should email me by 12 noon a Methods and Results section (including figures and/or Tables) based on their data. Please submit only *.docx or *.rtf files. Also, bring a hard copy to class for peer review. I will also review these and return them electronically ASAP. Please send these as soon as they are ready – this assignment is ungraded, but will help you immensely in writing a better paper, especially if you put a good effort into this first draft.
Assignments

• Monday September 14

Meet at the Science Building at 1pm to drive to CERA.

Activity: Take data on burn/no burn experiment at CERA.

Readings: A Primer of Experimental Design [Handout]

Individual assignment (due by 12 noon Monday Sept 14): Find two papers from the primary literature that are relevant to your prairie comparison study. Email me the following for each paper: a summary of the approach, findings and interpretation (one paragraph); a statement about the relevance of each study to your study (one paragraph).

• Wednesday September 16 -- Meet at 1:15 pm in Science 1823. We will engage in peer review of your papers.

Assignment: Email me by NOON a draft of your paper in *.docx or .rtf format (YOUR_NAME.docx or YOUR_NAME.rtf). Bring in to class a hard copy for your peer reviewer. It MUST be complete, i.e., you should have written something for each section of the paper. See Investigations for details on form and style. Special reminder: The Methods and Results sections may be identical to those of your project partners. The remainder of the paper should reflect your individual efforts.

• Friday September 18th -- Meet in Science 1823 at 1:15 pm.

An electronic version of your paper is due VIA EMAIL (as an attachment) to me by 5 pm today!

Readings: [Download from the class website]


1. Hulbert's study was designed to tease apart different effects of fire on the prairie ecosystem. What are these different effects? Why did Hulbert's study incorporate experimental manipulations?
2. What are the possible mechanisms by which fire influences insect abundance? Why might different groups of insects respond differently to burning?
3. Criticize these two experiments -- were they designed well? How would you change the design of each? Did the authors do a good job conveying the results and their meaning? What follow-up study would you design to extend the investigations described in each of these papers?
Assignments

Monday September 21 -- CERA Fire Experiment Sampling

Leave from the Science Building at 1 pm.

Activity: Continue data collection from the burn/no burn experiment at CERA.

Reading: None.

Assignment: Fill out (individually) as much as you can of the Planning Investigations Form.

Think about how you will finish collecting data, or modify or extend your data collection from last week. It will probably help to do some investigation of the primary literature to help determine this. Email me before Monday mornings if you need any equipment you didn’t have last week or you have questions.

Wednesday September 23

Class will begin at 1:15 pm in 1823.

Activity: Data analysis of burn/no burn experiment and discussion of oral presentations.

Readings (from Investigations): Data Analysis (pp. 12-13 of), the t-test (pp. 45-47), Correlation analysis (pp. 56-57) AND The Oral presentation (pp. 39-40).

Assignments:

(1) Find a paper in the primary literature that is related to your aspect of the burn/no burn experiment. Read it carefully, then prepare a short response in which you (a) summarize the study and (b) discuss its relevance to your study. Email this to me before 12 noon on Wednesday as *.docx or *.rtf file.

(2) Do the t-test example problems on p. 44 of Investigations using Minitab (in one of the campus computing labs).

Friday September 25:

Class will begin at 1:15 in Science 1823.

Activity: Discussion of patterns of diversity in biological communities.

Readings: Chapter 3 of Konza Prairie, A Tallgrass Natural History
        Chapters 50, and 53.2-3 (Community Structure and Dynamics) of Biological Science

Focus questions:

1. What factors influence the composition of communities at the largest spatial scale.
2. Describe mechanisms of disturbance that act at different spatial scales. Which of these are most important in prairies?
3. What is succession?
4. What is a dynamic mosaic?
5. Explain why counting the number of species in a community might not be the best way of measure “species diversity”.
6. Describe the different ways that researchers have studied the factors that influence species diversity.
Assignments

Monday Sept 28 – Oral presentations and lecture/discussion

Class will begin at 1:15 in 1823

Activity: Group oral presentations of the results of the burn/no burn experiment. Please put your presentation in the project folder for the class (\Storage\PROJECTS\Bio\Bio 150\Prairie Restoration\FinalPPT) by 1 pm.

Your presentations should last a maximum of 15 minutes, including time for questions.

Wednesday Sept 30 -- Meet in Science 1823 at 1:15 pm

Activity: Lecture/discussion and brainstorming about group research projects.

Readings:

- Chapter 4 of Konza Prairie

Focus questions:

1. Why are grasses so successful in prairies?
2. How do grasses and other plants adapt to the presence of fire?
3. What is the significance of C3 vs. C4 metabolism in prairie plants?
4. How does fire impact different parts of the ecosystem? Are the effects of fire always the same?
5. Develop a list of important prairie animals. Organize them by taxonomic group, then by trophic level (i.e., their position in the food web). What are some of the factors that influence the abundance of an animal species?
6. Compare and contrast the effects of grazing by small vs. large mammals on the diversity of tallgrass prairies. Why do small and large mammals have different effects on plant diversity? Given these effects, how would you manipulate grazers on a prairie to maximize species diversity?
7. Describe the relationship between species diversity and resource availability. Given this relationship, how would you manage a prairie to maximize species diversity?

Friday October 2

Class begins at 1:15 in Science 1823.

Activity: Discussion and project planning

Reading and Assignments:

(a) Find a primary literature article that is relevant to the question you developed on Wednesday. Email me a short summary (2 paragraphs) that describes the study and its relevance to your questions – bring paper copies for your project partners.

(b) Write out answers to the first 5 points on the “Investigation planning form” for your question in your field notebook.
Assignments

Monday October 8.  Meet at 1pm at the Science Building to travel to CERA

*Group assignment:* Find at least 3 additional resources (at least 2 from the primary literature) that are relevant to your intended project. Read them, and then write up a single group report that lists the citation for each article or chapter, summarizes it, and reflects on its relevance for your study (i.e., did it give you new ideas or techniques, did it change how you are framing your question, did it answer some important question?). Email this to me by noon.

*Activity:* We’ll spend the time as CERA further defining the scope of each group’s long-term project. Your time there could be spent examining potential field sites, working out experimental or sampling designs, talking with us about design or learning to use any equipment you’ll need. *Please let us know by email before 10 am on Monday (sooner would be better) if you need special equipment.*

Wednesday October 10.  Meet at 1pm at the Science Building to travel to CERA

*Group assignment:* Each group should email [brownj] a draft “Investigation Planning Form” (handout) by 12 noon. If you have special equipment needs, send those requests ASAP to both [brownj] and [Kolbe]

*Activity:* Continue developing project at CERA.

Friday October 12.  Meet at 1:15 pm in 1823 for lecture/discussion.

*Readings:* Chapter 4 of Konza Prairie; in addition, check a general biology text (e.g., those available for use in the Science library) on the differences between C3 and C4 photosynthesis. See focus questions for Sept 30.

*Group assignment:* Bring in a completed draft of the Investigation planning form for your project.
Assignments

Monday October 12

Meet the bus at the Science Building at 1 pm to travel to CERA

*Group assignment (emailed to me before 1 pm):* Prepare a formal, 3-4 page, typed proposal for your project:

**Introduction** -- Put your project into a larger context. What general issues in ecology, biology or restoration does it address? In other words, what makes it an interesting project? What specific questions does your project address? Use literature citations to support your arguments, and justify your hypotheses.

**Methods** -- What is the design of your project? Be as specific as you can about how you plan to set up experiments or observational studies, take data, analyze the data and interpret the results.

**Schedule** – Describe in detail how you will complete the project successfully (consult the syllabus for dates).

**Literature** -- Provide a bibliography of relevant resources, including ones you think are useful but not cited in the proposal. This may include reference books (textbooks, manuals, etc.), but should also include articles from scientific journals.

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Wednesday October 14  NO CLASS

Anyone wishing to work on project activities is welcome to do so, but not required or expected to. Contact me if you need to go to CERA and we’ll find a way to get you there.

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Friday Oct 16 – Meet at 1:15 in Room 1823

This is a one-hour exam (but in order to relieve any time pressure, everyone will have up two hours to take it).
**Assignments**

**Monday October 26**

Activity: Continuation of projects at CERA. Leave from the Science Building at 1 pm. *Please let us me and Sue know by email if your group will not be going out to CERA or you will need special equipment.*

**Wednesday October 28**

Activity: Continuation of projects at CERA. Leave from the Science Building at 1 pm. *Please let us me and Sue know by email if your group will not be going out to CERA or you will need special equipment.*

**Friday October 30**

Activity: Discussion of soils and nutrient cycling in Science 1823 at 1:15 pm.

Reading assignments: pp. 125-130 and Chapter 6 from *Konza Prairie*. Chapter 54 from *Biological Science*

*Focus questions:*

1. Describe how climate, topography, and organisms influence soil characteristics.

2. Describe how plants benefit from associations with fungi and bacteria in the soil.

3. Describe one way in which each of the following types of soil organisms influences the soil ecosystem: nematodes, earthworms, arthropods, and vertebrates.

4. Describe the water, carbon, and nitrogen cycles.
Assignments

Monday Nov 2 -- *Please send me by 8 am MONDAY* (by email) a progress report on your project, including the following details:

1. What has been accomplished to date. Have you changed your plans, as described in your proposal? If so, describe how these have changed. What data have you gathered so far? Any trends (perhaps you could start entering data)?
2. Your specific plans for Monday. Include in these plans a list of equipment you’ll need. Make sure you let me know if you will NOT be going to CERA.
3. Your specific plans for Wednesday. Include in these plans a list of equipment you’ll need. Make sure you let me know if you will NOT be going to CERA.

Activity: Continuation of projects at CERA. Leave from Science Building at 1 pm.

Wednesday November 4

Activity: Continuation of projects at CERA or on campus. Leave from Science Building at 1 pm.

Friday November 6 -- 1823 -- Continuation of Oct 30 lecture subject

Monday November 9 -- *Each group should send me* (by email) a progress report on your project *by 8 am MONDAY*.

Activity: Continuation of projects in 1823.

Wednesday November 11


*Please email me a question for class discussion by 11:59 pm on Tuesday.*

Activity: Continuation of projects in 1823.

Thursday Nov. 12 -- 6:30-8:00 PM – Bio 150 Project Consultations

See separate sheet for specifics of this assignment.

Friday November 13

No class
**Assignments**

**Monday November 16**

Activity: Data gathering/analysis/writing on campus. Laptops will be available in 1822 for your use.

**Wednesday November 18**

Activity: Data gathering/analysis/writing on campus. Laptops will be available in 1822 for your use.

**Email me a draft of your group’s Methods and Results section (including figures and tables) for ungraded review by the end of the class period.**

**Friday November 20 – meet in Science 1823 at 1:15**

Activity: Activity: Discussion of conservation and restoration research.

Reading: Chapter 9 of *Konza Prairie* (also go to the website at [http://climate.konza.ksu.edu](http://climate.konza.ksu.edu/) and browse through *Ongoing Projects* for an update on current research on Konza) and Chapter 55 of *Biological Science*.

Focus questions:

1. How would you define the term conservation biologist? What questions do such people address and what techniques are used to test hypotheses?
2. What evolutionary and ecological principles underlie the ways that humans have impacted biodiversity? How are these effects studied and their importance evaluated?
3. Of the several reasons for preserving biodiversity listed in this chapter, which (if any) is the most persuasive? Explain your reasoning, or provide an alternative.
4. Do you see any distinctions or conflicts between the goals of preservation and restoration? What role should groups of scientists (including those at CERA and Konza LTER) play in setting conservation priorities?

**Monday November 23**

Writing workshop in 1822/23.

**Your first draft of your group project paper is due by 12 noon Wednesday Nov 25 by email. This will be graded and count for ¼ of the project paper grade.**

**Wednesday-Friday November 25-27**

No class. Give thanks!
Assignments

Monday November 30 -- Meet in Science 1823 at 1:15 pm.


Please submit a question for class discussion via email by 9 am. Make sure the question is one that will stimulate discussion of the reading!

We will also discuss peer reviews and distribute papers to reviewers.

Wednesday December 2

Meet in Science 1823 at 1:15 pm. Email me a copy of your peer review by 12 noon, and bring a hard copy to class to give to the authors.

Friday December 4

FINAL VERSION OF YOUR GROUP PROJECT PAPER IS DUE by 12 noon by email

Meet in Science 1823 at 1:15 pm. We will work on poster design.

Reading assignment: Read Investigations (The Scientific Poster)

Monday December 7

Meet at 1:15 in 1823. Each group should have a near-final draft (all elements present, proofread, good-looking etc.). We will spend the time peer reviewing posters. Final versions of posters will be due at 4 pm.

Wednesday December 9

No class.

Thursday December 10 – Bio 150 poster session

All Bio 150 sections will participate a common public poster session, which will run from 11 AM to 12:45 in the 1st floor Science Elbow. Lunch will be provided. Attendance is required.

Friday December 11

Meet in Science 1823 at 1:15 pm. Final discussion and course evaluation.

Thursday December 17

Final Exam at 9 am in Science 1823.