

## ANIMAL BEHAVIOR & ZOOLOGY: FALL QUARTER, 2008

### FIRST DAY HANDOUT

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Familiarize yourself with the website, and get in the habit of checking the announcements page for, well, announcements.

### OVERVIEW AND CAUTIONS:

This quarter we will begin our examination of what animals do, how they accomplish these tasks, and why they do them. Focus will be on “why” kinds of questions: Why do antelope live in groups? Why are so many birds monogamous? Why do many ants, bees and wasps forego reproduction? Why do male moose have big antlers? Why does infanticide persist in lions and langur monkeys? Why do frogs call?

To answer these sorts of questions, you must probe into ecological and evolutionary logic, and so we will. You will be expected to engage some of the complex and often contradictory scientific predictions and results that have been generated in this field. You will likely have an emotional reaction to some of this material, but you will be expected to assess data and theory alike scientifically. We will focus on social behavior, with topics including mating systems, territoriality, competition, communication, parental care, mate choice, plant/animal interactions, parasitism, mutualisms, and convergent evolution. Some of our readings will be on one particular animal species, *Homo sapiens*, which can be understood with many of the same tools that we use to understand other animals.

Finally, to truly understand what animals are doing, you must go out and watch them. Thus, for collaborative research projects, you must spend at least seven days in the field over several weeks, in order to collect enough data to actually garner “a feeling for the organism,” as Barbara McClintock (corn geneticist and Nobel laureate) once said. This means at least four full days of program-related work, each week, for several weeks during the quarter.

### TEXTS AND OTHER REQUIRED PURCHASES AND EXPENSES

- Six texts, as listed on website.
- Animal Behavior Coursepack. Available from me. \$25 each (my cost).
- Rite-N-The-Rain notebook(s), for data and observations during our group field trips, and for collecting data during your independent projects.
- Digital watch with stopwatch/timer capabilities.
- \$240 submitted to the Cashier, into your student account (take your A#), for field trips.
- Any additional expenses associated with your independent research project. Some equipment may be available on loan from LabStores, but do not count on it.

### OPTIONAL (BUT RECOMMENDED) TEXTS AND OTHER EQUIPMENT

- Evolutionary Ecology (6th ed.). By Eric Pianka. 1999. Addison-Wesley. 512 pp.
- Field guides for the organism(s) you’re working on for your collaborative research
- Binoculars, preferably water-resistant, at least 8x. You will want these this quarter, and will *really* want them next quarter, in Panama.

## READINGS

There are a lot of assignments, including substantial readings from the primary literature. You are all adults. I expect you to figure out when you already know something (and can therefore skim a section), and when you aren't getting it (and need to go back and reread).

## TAKE-HOME EXAMS

There will be three take-home exams during the quarter, based mostly on lectures and readings; these will take the form of short essays. You will be expected to work alone on these, but may use any other non-human resources at your disposal.

## SYNTHESIS QUESTIONS

Assigned many weeks, "synthesis questions" are, like the exams, designed to help you deepen & integrate your understanding. Your written answers to these are due in class the following Monday, when you will be discussing your answers in small groups, then all together as a class. You are encouraged to work collaboratively on these assignments.

## SEMINARS

For five seminars during the quarter, student groups will lead the discussion.

## LECTURE

It is my hope that lectures will involve a lot of back-and-forth and questions. You don't want me to just talk at you for several hours each week, and neither do I. Some lectures will include workshops, to help you wrestle with the ideas in a different format. You are expected to do the reading before showing up. I will rarely reiterate material from the readings during lecture, as that seems like a waste of all of our time, so I will assume that you are familiar with the reading material, and will build on concepts found in the text during lecture.

## STATISTICS WORKSHOPS

We will have weekly, 2 ½ hour statistic workshops that will introduce you to the power and limitations of statistics, their particular application in behavioral research, and the use of Excel and R, an open-source statistical package that we will be learning together. Some weeks you will have work to turn in from these workshops, but much of your statistical learning will be put to the test when you analyze your own data.

## ANIMAL PRESENTATIONS

During the week 5 field trip, each one of you will give a 5 minute PowerPoint presentation on a local organism that you have signed up for: what is it (e.g. rodent, damselfly, bird), where is it found (and with what other organisms), and what does it do (its life history and ecology). You are expected to use at least three sources from the primary literature to put together this report, but there are also some good animal diversity websites that can help you focus your attention. Everyone will also produce an annotated bibliography from their research.

## FIELD TRIPS

As a class, there will be one day trip, and two multi-day field trips. The schedule is:

September 30: NorthWest Trek

October 6 - 11: Sun Lakes State Park (in Eastern Washington's "scablands")

October 27 - 30: Brooks Memorial State Park (Columbia River Gorge area)

## COLLABORATIVE RESEARCH PROJECTS

You and a partner are going to do empirical science, a project which you and a partner will imagine, research, design, implement, analyze, interpret, and present, from start to finish:

1. **Imagine:** What are you interested in? Are you driven to study a particular organism (e.g. the pileated woodpecker)? Or a particular question (e.g. seasonal territoriality)? Figure it out, and pick a topic. Specifically—what is your hypothesis? What question are you trying to answer?
2. **Research:** Now that you have a topic, what is known about it already? You will be producing a scientific paper at the end of this, which requires a “literature review” of the topic that you have done research on. Your library research will likely be ongoing as you discover new things about the system you are studying, but before you begin field work, you should be able to write an outline of the Introduction section (barring unforeseen changes in your topic as you embark on field work). You will save time and frustration if you plan to go to UW’s library to conduct some of this research.
3. **Design:** Now that you know a fair bit about what has already been done on your topic, hone your hypothesis (or hypotheses). Come up with as many alternative hypotheses as you can to explain the pattern, or question, that you are trying to answer. Derive the predictions that follow from those hypotheses. Now figure out what test (be it experimental or purely observational) would enable you to distinguish between the hypotheses. Can you implement this test? Is it feasible and practical? If yes, you’re ready for the next step.
4. **Implement:** The field work. You’ve got a set of hypotheses, you know what there is to know about your topic, you’ve designed a test to answer your question—now get out there and start collecting data! Be prepared for roadblocks, and for nothing to be done as quickly as you were hoping for.
5. **Analyze:** Once you’ve got all of your data, you need to do something with it. This will involve statistical analysis. Stats workshops will familiarize you both with the power and meaning of statistics, and with two stats programs (Excel and R).
6. **Interpret:** You’ve got analyzed results, but what do they mean? How do they fit into the context of what is already known about this system? About these sorts of questions generally? About animal behavior at large? What has your study added to our knowledge? Is it another brick in the wall of knowledge (as most research is), or have you discovered something truly new and different? What is the most exciting (yet rigorous and honest) meaning that your data could have? This is where you tie theory together with your data, and you make them sing.
7. **Present:** Every research group will both give a talk, and write a scholarly paper.

## STUDENT EVALUATIONS WILL BE BASED ON:

- All aspects of your collaborative research project
- Performance on each of three take-home exams
- Written responses to, and participation in class discussion of, synthesis questions
- Leading, as part of a student group, a seminar; participation in remaining seminars.
- “Animal presentation” and annotated bibliography
- Statistics workshops
- Attendance at and timeliness in all aspects of the program, including field trips
- Engagement with the material during lectures, workshops, and other class activities, and willingness to help others learn

The quality of your work, level of understanding, effort, and extent of improvement will all be important in your evaluation.