

General Ecology – Ecological Observation Writing Assignment

Develop a casual ecological observation into a research proposal

Learning objectives:

- Develop a coherent research plan for a simple ecological question
- Consider ecological principles from an experimental perspective
- Continue learning to search and comprehend scientific literature
- Continue developing your technical writing

In this assignment, you will produce a formal proposal describing a research project that could address one of your Ecological Observations. You should select your favorite EO from the semester so far, and flesh it out into a more detailed project plan.

A word about **collaboration**: I do strongly encourage you to work together on this project – use the Blackboard discussion boards to run ideas past each other, exchange tips on experimental methods ideas, etc. However, I expect each of you to turn in original work.

A word about the **style** of your paper: This paper will be written in a style similar to a typical scientific paper, with Introduction, Hypothesis, Methods, and Expected Results sections. I have provided instructions about the kinds of information to present in each section. In your paper, please organize your writing into these sections as well. Like in the first writing assignment, your writing should be technical, not colloquial. Scientific writing can be very stilted and formal, but modern scientific writing typically uses first person active voice (“I will use cages to keep robins out of my garden”) instead of passive voice (“Cages will be used...”). I leave this choice to your discretion, but encourage active voice.

A word about **formatting** your paper: Please double-space your paper and use a font and font size that are easy to read (Times New Roman, 12 pt. is best). Use proper in-text and bibliographic citations – the style found here is typical of most ecology journals: <http://libraries.wsu.edu/quickguides/sssa>. Other than these items, I have no strong preferences about your formatting, so long as it’s readable. I anticipate that your paper will end up about 4-5 pages in length, but you will not be penalized for being outside this range, so long as all the necessary content has been adequately addressed.

A word about **confusion**: In this assignment, as in everything we do in this class, please get in touch with me if you run into a wall about what you’re supposed to find, supposed to do, or supposed to understand. I’m always happy to help. But I do expect that you will have made solid efforts to work out the problems on your own first. When you do ask for assistance please include information about what you’ve already tried, so that I know that you have already given it a go (and so I don’t head down the same path you were on when you encountered trouble!).

Introduction

The goal of this section is to give readers background to the research topic you will be addressing. You will need to explore the scientific literature related to your Ecological Observation, to give readers a feel for what is already known about this general subject area.

You might need to introduce the species involved and the ecosystem they live in. You will need to discuss the ecological concept (e.g. competition, performance curves, disturbance, etc.), and

you should definitely discuss any research you can find that relates the species to the concept. If you can't find anything relating the concept to your focal species, you should at least be able to find something about similar species. You will need to spend some time in your favorite scientific literature database to locate these papers. When you write this section of your paper, provide proper citations of **any and all** information you use. I expect that you will find, read, and incorporate into this section at **minimum 4** different **peer-reviewed articles** about your topic. (More is fine, of course, but you must have at least 4.)

You should end this section by explaining **why you are conducting this experiment** (i.e. what pattern did you observe that got you interested in this topic?), and by clearly stating your **research intentions** (e.g. "My objective in this paper is to determine how robins affect the worm population in my garden," or "In this project I will...", or "This research project will investigate..." etc.).

Hypothesis

In 1-2 sentences, what **mechanism** do you expect explains your observation? Be clear about the specific mechanism and how it operates. For example, "I hypothesize that predation by robins limits the worm population size in my garden," (NOT "I hypothesize that robins affect worm populations in my garden") or "I hypothesize that the niche of maple trees is limited by exploitation competition with fir trees" (NOT "I hypothesize that maples are limited by firs").

Proposed Methods

The goal of this section is to give readers a complete understanding of how you would test your hypothesis. What manipulative experiment or observational study could you do? What kinds of materials do you need? What **treatments** would you use? What **sample size** do you want in each treatment? How long would your experiment run? Try to balance ideal conditions (sample size of a billion! let it run for 100 years!) with the realities of budgetary and logistical constraints.

As you're writing this section, consider these two points: First, is there a different experiment you might do that could help address your hypothesis better or more simply? Second, are your instructions clear enough that someone else could exactly replicate your experiment? If you didn't do a peanut butter and jelly instructions experiment in middle- or high- school science classes, try watching this video <https://youtu.be/RjHzD2sfWcQ> for a demonstration of how what you think are clear and replicable instructions may be misinterpreted.

Expected results

Describe the results you would expect from your experiment, assuming your explanatory hypothesis **is correct**. Building on my example from above, say I built robin-excluding cages over 5 random 1 m² plots within my garden, and left 5 other plots uncaged. My results might be: worm abundance increased from 10/m² before the experiment to 25/m² within the caged plots, but on increased to 15/m² in the uncaged plots.

Also describe the results you would expect assuming your explanatory hypothesis **is not correct** (for me, this might be that both plots increased to 15 worms/m², regardless of robin exclusion).

Bibliography

Be certain that all your citations are listed here. See notes above for formatting tips.