

## Research proposal assignment

The major writing assignment in this course is a research proposal. For the proposal, you must select a topic related to evolution and ***meet with the instructor to approve your topic***. Your proposal should present an interesting question in evolutionary biology, describe a system in which to study one aspect of the question, and explain in detail a feasible experiment. We will discuss in class the specific requirements for a successful research proposal. You will be graded on your final draft of the ***proposal***, your ***“review” of proposals*** written by other students, and your ***participation on a mock “review panel”***.

**Step 1: Identify a topic that you want to investigate.** Good sources of ideas include lectures, your textbook, problem sets/simulations, and discussions. Other sources of ideas include topics from other biology classes and your favorite aspects of biology. For these sources, you will need to ask yourself how you can relate the topic to evolution. If you are having trouble coming up with a topic, or are not sure if your ideas are feasible, please check with the instructor.

**Step 2: Meet with the instructor to discuss and approve your topic.** Ideally, you should have your topic approved before you move on to Step 3. Try to schedule this meeting as soon as possible. The last date that you can have this meeting is ***April 4***.

**Step 3: Locate two sources (journal articles) for your proposal.** The experiment that you plan can be a follow-up to the research described in one or both of the articles. These articles (1) must be *directly* related to your topic, (2) must be from primary sources (scientific journals, not popular press), and (3) must describe an experiment or study, rather than a review of other results. If you have any doubts about whether your articles are appropriate, check with the instructor before proceeding to Step 4. Searching for sources will be described in a separate handout.

**Step 4: Write two source summaries.** Summarize each article as you have been doing for the discussion readings. In addition, you should discuss how this article relates to your topic and how you will use it in your proposal. Each summary should: (1) be clearly written, (2) clearly explain the main point of the article, (3) clearly describe the data in the article, and explain how the data in help support the main point, (4) clearly explain how the article relates to your topic and your proposal, and (5) be at least 300 words long, or longer if necessary to meet the first 4 points. Source summaries are due by ***April 7*** at 10 p.m. You are required to turn in a copy of each paper; you may want to make an extra copy of each article, so you have one to turn in and one to keep.

**Step 5: Design your experiment.** Start with a specific question or hypothesis. Ideally, this question or hypothesis will stem from the research in the two articles. Design an experiment or study that will definitively allow you to support or disprove your hypothesis. For ideas on experimental design, consult lectures, your textbook, discussion papers, problem sets—or come up with an idea of your own. Be sure that your experiment will allow you to support or disprove your hypothesis. If you have any doubts about whether your experiment is appropriate, check with the instructor before proceeding to Step 6.

**Step 6: Write your proposal.** The proposal is due in class on *April 21*. You will need to turn in one hard copy with your name on it for the instructor and two hard copies *without your name* for peer review. Your proposal should be extremely well written, should clearly explain the general question and the background, and should present an effective experiment. Although your proposal will not be graded on length, it will probably take you *at least* four double-spaced pages (about 1000 words) to write a good proposal. An example of what goes in a good proposal will be provided in a separate handout.

***Your proposal will have five sections:***

***Introduction*** – Develop the background for your topic. Explain why your topic is interesting or important. Introduce the study system (e.g., the species you’ll be studying). Describe previous work on the topic, including but not limited to your two sources. Explain the questions that the previous work answered, and explain how the previous work leads up to your question or hypothesis.

***Hypothesis*** – Describe your *hypothesis* (your proposed answer to your question, which you will test in your experiment). Explain why you think this hypothesis may be correct. State a *critical prediction* of the hypothesis. A critical prediction is a result that will occur if your hypothesis is correct, but not if your hypothesis is incorrect. Ideally, your experiment should be a test of the critical prediction.

***Methods*** – Describe your experiment or study in plenty of detail. (An ‘experiment’ is a study where you manipulate a variable. If you take measurements without doing a manipulation—as in the Darwin’s finch paper and the dung beetle paper—it’s not an experiment and you should call it a ‘study’.) Include enough detail that someone could actually do the experiment well enough to get good results. Explain *why* you’ve designed the experiment in the way you have; try to convince the reader that your experiment is the best way to test your hypothesis. You might want to include a diagram, drawing, or table, if it will help you explain your experiment or study.

***Possible results*** – Describe the result that you expect *if* your hypothesis is true; in other words, results that would support your hypothesis. Include enough detail that someone unfamiliar with your study could look at the actual results and determine whether they support your hypothesis. Include a graph or table to show the expected results. Then describe the result that you would expect if your hypothesis is *not* true; in other words, results that would fail to support your hypothesis. Again, include plenty of details and include a graph or table.

***Literature cited*** – List the sources that you referred to in your proposal. This will include your two original sources and any other articles or books that you cite.