

## Guide to your written paper

The goal of the written paper is to:

- (1) Provide students an opportunity to explore a controversial hypothesis to explain latitudinal variation in diversity in detail, &
- (2) Encourage students to evaluate and critique ideas and evidence in an active area of biodiversity research.

**The written paper will make up 35% of your final mark in the course.**

Write a short paper (8-12 pages, double spaced, not including references) following the format of reviews in *Trends in Ecology and Evolution* (available online through our library), reviewing one major hypothesis to explain latitudinal variation in diversity. I suggest that you focus on the same hypothesis that you covered in your major presentation. You may, however, choose a new hypothesis if you wish. I would like only one student per hypothesis.

In your paper, please include:

- (1) A succinct, crystal clear explanation of the hypothesis and how it could create latitudinal variation in diversity (create a figure or flow chart if you like).
- (2) A mention of what makes this hypothesis different from other similar hypotheses to explain latitudinal variation in diversity.
- (3) A short history of the hypothesis — who first proposed it, who has studied it.
- (4) A clear list of predictions of the hypothesis, especially highlighting predictions that are unique to the hypothesis. By unique, I mean predictions that no other hypothesis would make (for example, many hypotheses predict higher tropical speciation rates, and thus this prediction is not unique to one hypothesis).
- (5) Review evidence for and against your hypothesis. Has anyone critically and adequately tested the predictions of your hypothesis? If your hypothesis is controversial, explain why.
- (6) Succinctly identify the key study or studies that need to be done (in your opinion) to convincingly reject your hypothesis. If I provided you 5 million dollars to study your hypothesis, what one study would you conduct? Why would this study be the most effective use of your funding? Feel free to draw on our discussions in class, including the ideas of other students.

Helpful hints: Stay organized and on topic. Please do not write a paper that reads like a book report. I am looking for a dynamic and engaging paper that provides insights and new perspectives (from you) into a controversial, important area in diversity research. Your paper should reference at least 6 different papers from the scientific literature (not books).

### Timeline

Choose topic by **Friday, 12 September**. Final papers are due **Friday, 12 December (11pm)**. Please send your final paper to me by email (pm45@queensu.ca) in word or pdf format. I will send you an email confirming the receipt of your paper within 24 hours – it is your responsibility to make sure that I receive it.

I am available to meet if you have any questions - just send me an email to set up a meeting.

## **Rubric**

### **Total 35 points**

**Clarity.** (4 points) Does your paper clearly and succinctly explain your hypothesis and the relevant predictions, tests, viewpoints, and ideas?

**Depth & Balance.** (4 points) Does your paper reach the heart of the key issues surrounding your hypothesis? For e.g., does your paper adequately discuss the major limitations, previous tests and opinions, and overall importance (from a biodiversity perspective) of your hypothesis? (2 pts)

Did you provide a balanced analysis of the issues? (2 pts)

**Synthesis.** (3 points) Does your paper synthesize relevant papers into a coherent review of the issues? (3 pts) [Avoid listing papers and findings like a 'laundry list' review. Focus on the content.]

**Critical Thinking.** (8 points) Does your assessment of your hypothesis illustrate critical thinking? (2 pts)

Do you provide a fair critique of ideas and evidence? (2 pts)

Do you include your own perspectives on the controversial issues? (2 pts)

Do you identify key areas of research that would help to clarify the controversy? (2 pts)

**Organization.** (6 points) How well does your paper flow? (3 pts)

Is your paper focused (i.e. does it stay on topic)? (3 pts)

**Overall Presentation.** (6 points) Is your paper readable? (2 pts)

Is the paper professional, with proper spelling and grammar? (2 pts)

Is your referencing coherent (i.e., do references match the sources)? (2 pts)

[see Tips for Effective Writing below; I will take off marks if you ignore these tips]

**Sources/References.** (4 points) Are your sources/references appropriate for your paper, and do they reflect adequate research into the issues? (2 pts)

Do your references adequately support your statements in your paper? (2 pts)

**Total = 35 points**

## Tips for Effective Writing

As biologists, we want to avoid weak thinking, weak science, and weak writing - one often leads to the other.

- "Vigorous writing is concise. A sentence should contain no unnecessary words, a paragraph no unnecessary sentences, for the same reason that a drawing should have no unnecessary lines and a machine no unnecessary parts. This requires not that the writer make all sentences short or avoid all detail and treat subjects only in outline, but that every word tell."  
- W. Strunk Jr., Elements of Style
- Use the active voice. E.g., NO: "The wings of warblers were measured ..." YES: "We measured the wings of warblers ..."
- Make sure sections of your paper correspond. (e.g., clearly list predictions in a particular order in the introduction, and keep the same order throughout).
- Avoid tangents. Stay focused!
- Make the paragraph the unit of composition. The opening sentence indicates by its subject the direction the paragraph is to take.
- Map out your paragraphs BEFORE you start writing. E.g., start with an outline of topic sentences, possibly with point form ideas to include in each paragraph.
- Make sure that every sentence within the paragraph pertains to your topic sentence of the paragraph.
- Put statements in positive form. E.g., NO: "He was not very often on time." YES: "He usually came late." Make definite assertions. Avoid tame, colourless, hesitating, noncommittal language.
- Use definite, specific, concrete language. E.g., NO: "A period of unfavourable weather set in." YES: "It rained every day for a week."
- Omit needless words. E.g., NO: "The reason why robin's eggs are blue is that ..." YES: "Robin's eggs are blue because ..." NO: "Tree Swallows are known to migrate." YES: "Tree Swallows migrate."
- Avoid jargon. For e.g., NO: "The trophic niche of the Short-eared Owl." YES: "Food of the Short-eared Owl" or "What Short-eared Owls eat."
- Express coordinate ideas in similar form. E.g., NO: "Formerly, science was taught by the textbook method, while now the laboratory method is employed." YES: "Formerly, science was taught by the textbook method; now it is taught by the laboratory method."
- Avoid pronouns as subjects. E.g., NO: "It is known that Tree Swallows migrate." YES: "Tree Swallows migrate." NO: "Tree Swallows migrate to warmer climates in winter. This is important because ..." YES: "Tree Swallows migrate to warmer climates in winter. Migrating south is important because ..."
- Make the biology the subject of the majority of your sentences. NO: "Smith et al. (1999) showed evidence for beetles burying carcasses. In another study, Johnson et al. (2012) found evidence for beetles feeding on eggs." YES: "Beetles bury carcasses (Smith et al. 1999) and feed on eggs (Johnson et al. 2012)."