

ENV 250 Final Project Guidelines and Rubric

Overview

The final project for this course is a **research thesis and poster** to be presented at a mock scientific conference. Students will conduct research on their chosen topic, keeping the processes of the scientific method in mind. The tasks for this assignment are to choose a relevant environmental issue, write appropriate hypotheses for the issue, research the topic to find primary sources that directly relate to the hypotheses, summarize the methods used in the sources, summarize the results from each source, and include a discussion which forms conclusions based on integration of the results obtained and addresses any discrepancies among the sources' findings.

The project is divided into **four milestones**, which will be submitted at various points throughout the course to scaffold learning and ensure quality final submissions. These milestones will be submitted in **Modules Two, Three, Four, and Five**. **The final thesis will be submitted in Module Seven** and will be a consolidation of each milestone into one thesis. **The poster also will be submitted in Module Seven** and will be presented to the class in a mock scientific conference.

In this assignment, you will demonstrate your mastery of the following course outcomes:

- Critically evaluate research articles given their knowledge of the scientific method
- Determine the validity of source materials cited within published research
- Write a research thesis including an abstract, proper introduction, valid methods, results, and discussion sections
- Use APA reference style to both cite within text and list references
- Investigate the use of both qualitative and quantitative methods in environmental research

Prompt

Each student will choose a research question related to environmental science and write a 10–12 page thesis on the subject. In addition, the student will create a poster presentation that summarizes the thesis to present at a mock scientific conference. Students may choose a topic from any sub-discipline within the realm of environmental science: biology, ecology, toxicology, urban issues, environmental policy and ethics, to name a few. Below are some sample research questions:

1. Does tree composition and structure differ between riparian zones and higher forests?
2. What effect does the pesticide atrazine have on aquatic life?
3. What is the safe level of arsenic in public drinking water?
4. How can municipalities increase recycling participation rates for its citizens?
5. How can humans best manage the relationship between themselves and top predators such as wolves and mountain lions?

Required elements include a title page, table of contents list of figures, abstract, introduction with methodology, results, discussion, and reference list. Students should refer to their text, *A Pocket Style Manual*, for information on how to properly cite sources. All citations must be in APA format. Posters will be created using the template provided in the Resources section of this document (below). Posters must include all of the required elements of the thesis except for the table of contents and list of figures. In addition, the poster should have a consistent visual theme, be organized in a logical way, and use transitions that create a natural and engaging flow.

While completing this summative task, each student will gain greater experience in scientific writing, critically evaluate research articles based on their knowledge of the scientific method, assess the validity of results obtained from scientific research, and enhance their knowledge of APA reference style format.

Note: In order to ensure that vertebrates are being held to the highest standards in vertebrate animal welfare, students should focus their research on plants or invertebrates. This includes all plants and invertebrate organisms such as insects, mollusks, or worm species. Again, please be sure that there are no testable questions or research involving vertebrates (mammals, reptiles, birds, amphibians, and/or fish) used in completing this assignment to maintain the highest standards in vertebrate animal welfare.

Specifically, the following critical elements must be addressed:

1. Select a relevant environmental issue/topic for the research thesis ensuring that you:
 - a. Determine and write appropriate **hypotheses** for your chosen research subject
 - b. Write a tentative **title** for the research thesis
 - c. Find **primary source material** for the topic chosen
 - d. Fully cite the source material using **APA format**
2. Write a **thesis introduction** which includes:
 - a. A **purpose statement** accompanied by specific, well-written **hypotheses**
 - b. A **summary of methodologies** from three primary sources
 - c. **Definitions of terms and research limitations**, as appropriate
3. Write a **results** section for your thesis which includes:
 - a. A **summary of results** from at least three primary sources written in paragraph form
 - b. At least **one figure**, such as (but not limited to) a table, graph, or picture, which aids in understanding the written results summary
4. Write a **discussion section** as follows:
 - a. The discussion section should **integrate the results** from all primary sources to **form general conclusions**
 - b. The discussion section should **address any major discrepancies** in the results obtained from various sources, if necessary
 - c. The discussion section should **offer suggestions for future research** efforts and **make recommendations for public safety and policy**, if appropriate

5. Write an **abstract** for your thesis which consists of:
 - a. A concise **summary of the thesis** to include a short statement of purpose and research objectives, abridged results, and briefly stated conclusions
6. In addition to the sections noted above, the final thesis must include the following **elements**:
 - a. A separate **title page** which consists of the title of the research thesis, the student's name, the class name and institution, and a statement near the bottom which states why the research is being conducted
 - b. A separate page with a **table of contents** and appropriate page numbers
 - c. A separate page with a **list of figures** consisting of the figure title as it appears in the text and the page number where it can be found
 - d. A separate page containing the **reference list** or bibliography presented in APA format
7. Create a **poster** to present at a mock conference using the template provided. The poster must include the following elements:
 - a. A **title** with author's name listed
 - b. All appropriate **elements**, including an abridged abstract, introduction with methodology, results, discussion, and list of references presented in APA format
 - c. At least one **figure**, such as (but not limited to) a table, graph, or picture. Since the poster is a visual presentation of the research conducted, more than one figure is encouraged
 - d. Logical **organization** to create a natural and engaging flow
 - e. A consistent **visual theme** that is aesthetically pleasing

Resources

- Your final thesis will be submitted using a Microsoft Word or similar program. Students can download [OpenOffice](#), a free word processing program.
- In-text and final reference lists must be done in APA format. Students should consult the course text, *A Pocket Style Manual*, for any questions regarding citations.
- In addition, the Shapiro Library at SNHU has some great writing resources, as well as searchable databases of academic works to consult. For this project, the use of reliable academic resources is crucial for ensuring the validity of results and the reliability of conclusions drawn from them. Academic resources include your textbook, journal articles, and government websites. Avoid the use of sites such as Wikipedia.com and Ask.com, as they are not considered academically reliable.
- For the poster, please use the following template to get started: [Poster Template](#).

Milestones

Milestone One: Thesis Topic

In **Module Two**, you will submit your **thesis topic**. The topic submission should include a tentative title for the thesis; specific, well-written hypotheses; and full citations for at least three sources that will be used in the thesis. **This milestone is graded with the Milestone One Rubric.**

Milestone Two: Thesis Introduction Including a Methods Section

In **Module Three**, you will submit a **completed introduction for your thesis**. The introduction must include a purpose statement accompanied by specific, well-written hypotheses. In addition, the introduction must include a summary of the methods used in three different literature sources. The methods summarized should be for three different types of studies. For example, if you chose the topic listed above regarding the effect of atrazine on aquatic life, you might summarize methods from one paper on how atrazine affects fish, from a second paper on how atrazine affects tadpoles, and a third paper on how atrazine affects algal growth. Each study would be conducted differently so the methods summary should be different. In addition, the introduction should contain definitions for terms used in the thesis as appropriate for greater reader understanding. Finally, the introduction should include any known limitations for the research. Your introduction and methods section must be 2 – 3 pages in length. **This milestone is graded with the Milestone Two Rubric.**

Milestone Three: Thesis Results Section

In **Module Four**, you will submit a **completed results section** which summarizes the results from a minimum of three primary literature sources. Students must include the results from the studies summarized in the methods section and should include results from additional studies as well. The results summary must be written in detail in paragraph form. In addition, students must include at least one figure, such as, but not limited to a table, graph, or picture. The figure(s) should be used only as an aid for understanding the data and not as a replacement for the written summary of results. Your results section must be 2 – 3 pages in length. **This milestone is graded with the Milestone Three Rubric.**

Milestone Four: Thesis Discussion Section and Abstract

In **Module Five**, you will submit a **completed discussion section and abstract**. The discussion section must include any conclusions drawn from the research reviewed, possible reasons for any major discrepancies in results among sources, and recommendations for future research. In addition, this section may include recommendations for safety or public policy as appropriate. The abstract is separate from the discussion section and is a concise summary of your thesis to include a short statement of purpose and research objectives, abridged results, and succinct conclusions. The discussion section must be 1 – 2 pages in length and the abstract must be ¼ - ½ page in length. **This milestone is graded with the Milestone Four Rubric.**

Final Submission: Final Thesis and Poster for Mock Scientific Conference

In **Module Seven**, you will submit a **complete thesis** and a **poster to be presented in a mock scientific conference**. The thesis will include a title page, abstract, table of contents, list of figures, introduction including methodology, results, discussion, and a full list of references. Acknowledgments and appendices are optional. The final thesis should incorporate feedback gained throughout the course. The poster must include all of the elements within the thesis (except for the table of contents and list of figures) but in a more abridged form. Please use the poster template in the Resources section to get started. In addition, the poster should have a consistent visual theme, be organized in a logical way and use transitions that create a natural and engaging flow. The final thesis must be 10 – 12 pages in length. **The final thesis and poster will be graded with the Final Project Rubric.**

Deliverables

Milestone	Deliverable	Module Due	Grading
1	Thesis Topic	Two	Graded separately; Milestone One Rubric
2	Thesis Introduction and Methods Section	Three	Graded separately; Milestone Two Rubric
3	Thesis Results Section	Four	Graded separately; Milestone Three Rubric
4	Thesis Discussion Section and Abstract	Five	Graded separately; Milestone Four Rubric
	Final Thesis and Poster for Mock Scientific Conference	Seven	Graded separately; Final Project Rubric (below)

Final Project Rubric

Guidelines for Submission: Your **research thesis and poster** must be 10–12 pages in length. Students must include a minimum of three sources, cited in APA format. The poster must be submitted using the template provided in the Resources section and must include all of the required elements of the thesis, except for the table of contents and list of figures.

Critical Elements	Exemplary (100%)	Proficient (85%)	Needs Improvement (55%)	Not Evident (0%)	Value
Environmental Topic: Hypotheses	Meets “Proficient” criteria and hypotheses are specific and well-written	Research and null hypotheses are detailed and testable	Hypotheses lack detail or are not testable	Does not include hypotheses	1
Environmental Topic: Title	Meets “Proficient” criteria and is well written and clearly represents the objectives of the thesis based on the hypotheses	Title adequately represents the objectives of the thesis based on the hypotheses	Title is included but is not well written or does not support the hypotheses	Does not include title	1
Environmental Topic: Primary Source Material	Meets “Proficient” criteria and is substantiated with rationale to support the sources chosen	Finds primary sources for the topic chosen	Primary sources for the topic chosen are minimal	Does not include primary sources for the topic chosen	1
Environmental Topic: APA Format	Meets “Proficient” criteria and citations contain no errors in punctuation or spelling	All source material was cited using APA format	Citations using APA format are not accurate	Source material was not cited using APA format	1
Introduction: Purpose Statement & Hypotheses	Meets “Proficient” criteria and develops a clearly defined purpose statement and specific hypotheses that are well-written and testable	Develops an adequate purpose statement and testable hypotheses	Develops a purpose statement and hypotheses but they are not well-written, lack clarity and/or may not be testable	Does not include a purpose statement and/or hypotheses within the introduction	2
Introduction: Summary of Methodologies	Meets “Proficient” criteria and is substantiated with research to support summary	Summarizes the test methods used in different studies	Inadequately summarizes test methods from different studies	Does not summarize test methods from different studies	10
Introduction: Definitions of Terms & Research Limitations	Meets “Proficient” criteria and defines all terms necessary for reader understanding and fully discusses research limitations	Defines terms necessary for reader and adequately discusses research limitations	Defines very few terms necessary for reader understanding and does not adequately discuss research limitations	Does not define any terms necessary for reader understanding and/or does not discuss research limitations	2

Results: Summary	Meets “Proficient” criteria and results presented directly relate to the hypotheses; summaries are well organized and logical	Summarizes the results from different studies and the results presented directly relate to the hypotheses; summaries are mostly organized and logical	Inadequately summarizes the results different studies and/or the results presented do not directly relate to the hypotheses; summaries are not well organized or not logical	Does not include any summaries of results and/or the results presented are completed unrelated to the hypotheses	10
Results: Figure(s)	Meets “Proficient” criteria and includes multiple figures; figures clearly summarize the results presented, are well formatted, and include descriptive labels/titles	Creates a figure that summarizes the results presented; the figure is clear and adequately labeled/titled	Creates a figure that summarizes some of the results and/or the figure is not understandable or not properly labeled/titled	Does not include any figures	4
Discussion: Integration of Results	Meets “Proficient” criteria and integrates the results from sources to form logical, well-thought-out conclusions that are fully supported by the data and directly relate to the hypotheses	Adequately integrates the results from sources to form conclusions that are supported by the data and relate to the hypotheses	Inadequately integrates the results from sources and/or forms conclusions with little support from the data and/or conclusions do not relate to the hypotheses	Does not integrate the results from multiple sources; conclusions are not supported by the data and/or do not relate to the hypotheses	4
Discussion: Address Discrepancies	Meets “Proficient” criteria and provides specific explanations for discrepancies in the data, incorporating multiple citations from primary sources to support explanations	Provides explanations for any discrepancies in the data, incorporating citations from primary sources to support explanations	Explanations for discrepancies in the data do not make sense and/or are not supported by citations from primary sources	Does not address discrepancies in the data	3
Discussion: Suggestions for Future Research	Meets “Proficient” criteria and suggestions are reasonable, well thought out, and directly relate to the hypotheses	Includes suggestions for future research that directly relate to the hypotheses	Suggestions for future research are not well thought out or do not directly relate to the hypotheses	Does not include any suggestions for future research and/or the suggestions are completely unrelated to the hypotheses	3
Abstract: Summary of Thesis	Meets “Proficient” criteria and abstract is well-written and inclusive	Submits an abstract comprising of a short statement of purpose and research objectives, abridged results, and briefly stated conclusions	Submits an abstract that is either not concise or does not include all of the required components	Does not include an abstract	10
Elements: Title Page	Meets “Proficient” criteria and is descriptive and explanatory	Creates a title page that includes a thesis title, author’s name, institution, and statement for why the research was conducted	Creates a title page that does not include the required components	Does not include a title page	3

Elements: Table of Contents	Meets “Proficient” criteria and table of contents is properly formatted with no errors in page numbers	Constructs a complete table of contents with appropriate page numbers	Constructs an incomplete table of contents or one with multiple incorrect page numbers	Does not include a table of contents	3
Elements: List of Figures	Meets “Proficient” criteria and list of figures is properly formatted with no errors in page numbers	Constructs a list of figures consisting of the figure title as it appears in the text and the page number where it can be found	Constructs an incomplete list of figures or one with multiple incorrect page numbers	Does not include a list of figures	3
Elements: Reference List	Creates a reference list that includes the sources used in the thesis with no errors in citations	Creates a reference list that includes the sources used in the thesis with some errors in citations	Creates a reference list that includes the sources used in the thesis with multiple errors in citations	Includes an incomplete reference list and/or the sources are mostly cited incorrectly	10
Poster: Title	Meets “Proficient” criteria and title is creative and unique	Includes a title with the author’s name listed	Includes a title but author’s name are not listed	Does not include a title and author’s name is not listed	2
Poster: Elements	Meets “Proficient” criteria and required elements are presented in a logical order with transitions	Includes the required elements presented with transitions	Omits various required elements and/or the elements are presented with poor transitions	Omits the required elements and/or the order of the elements is illogical	7
Poster: Figure(s)	Meets “Proficient” criteria and includes multiple figures	Includes a figure which is properly formatted, understandable, and placed in a logical location	Includes a figure which is difficult to understand and/or placed in an illogical location	Does not include a figure	6
Poster: Organization	Meets “Proficient” criteria and organization of the poster looks professional	Creates a poster that is logically organized and facilitates a natural and engaging flow	Creates a poster which does not flow well but is understandable	Creates an unprofessional-looking poster that lacks a natural and engaging flow	4
Poster: Visual Theme	Meets “Proficient” criteria and color choices and graphics bolster the presentation	Creates a poster with a visual theme in which color choices and graphics do not detract from the presentation	Creates a poster in which color choices and graphics are either too distracting or used too sparsely	Creates a poster in which color choices and graphics detract from the presentation	5
Articulation of Response	Submission is free of errors related to citations, grammar, spelling, syntax, and organization and is presented in a professional and easy-to-read format	Submission has no major errors related to citations, grammar, spelling, syntax, or organization	Submission has major errors related to citations, grammar, spelling, syntax, or organization that negatively impact readability and articulation of main ideas	Submission has critical errors related to citations, grammar, spelling, syntax, or organization that prevent understanding of ideas	5
Earned Total					100%