

SCI 200 Project Part One Guidelines and Rubric

Overview

Basic scientific literacy is essential for understanding real-world applications of the natural sciences. As a consumer and voter, you will be faced with issues that require a basic understanding of science. For example, you might ask yourself the following questions: How can genetically modified foods affect my health? Should scientists be held liable for not predicting earthquakes that led to human casualties, as they were in Italy in 2012? Is anthropogenic climate change real? Is fracking a concern where I live? Because of the prevalence of natural science issues such as these, it is important to understand basic natural science concepts and how they impact our daily lives.

The project for this course has two parts. In Part One, you will conduct a research investigation that examines an issue in the natural sciences. You will identify appropriate resources for investigating the issue you select, use these resources to develop a question related to the issue, and apply natural science principles to the issue and question. In addition, you will identify an audience who would be interested in the selected issue. In Part Two, you will develop a presentation for the audience you identified in Part One. In your presentation, you will explain how scientific thinking has impacted you and your audience, supporting your claims with evidence.

Part One of this project addresses the following course outcomes:

- Illustrate the impact of scientific thinking on personal and professional experiences
- Select appropriate and relevant science resources in investigating contemporary issues in the natural sciences
- Communicate effectively to specific audiences in examining fundamental aspects of the natural world
- Apply essential principles of the natural sciences in addressing critical questions related to the natural world

Prompt

Select a contemporary issue in the natural sciences to investigate. You may select an issue that was discussed in the course, or you may select your own, with instructor approval. You could consider using your topic and question from Perspectives in the Natural Sciences if they are something you would like to investigate further for this project. After selecting an issue, you will conduct a research investigation, identifying appropriate resources for researching the issue, developing a question related to the issue, and applying principles of natural science to your issue and question. You will submit your planning document as a written report.

Specifically, the following **critical elements** must be addressed:

- I. **Introduction:** In this section, you will discuss your natural science issue and select resources that you can use to research the issue. This will lead you to the development of a research question related to your issue. Specifically, you should:
 - a. Describe the **issue** in the natural sciences that you have selected to investigate. Why is this issue significant?
 - b. Describe at least three **science resources** that you could use to investigate the issue you selected. Your sources must be relevant to your issue and must be of an academic nature appropriate for the issue. In your description, consider questions such as: What are the similarities and differences in the content of your sources? What makes them appropriate and relevant for investigating your issue? What was your thought process when you were searching for sources? How did you make choices?
 - c. Based on your review of science resources, develop a **specific question** related to the issue you selected. In other words, what would you like to know more about?
- II. **Body:** In this section, you will use the natural science resources that you selected to investigate your question, focusing on an appropriate audience and the scientific principles related to the issue. Make sure to cite your sources. Based on your research:
 - a. Identify an **audience** that would be interested in your issue and the question you developed. For example, who would benefit most from hearing your message, or who could best help in addressing the issue?
 - b. Describe how and why you can tailor your **message** to your audience, providing specific examples. For example, will your audience understand scientific terminology and principles, or will you need to explain them? How will you communicate effectively with your audience?
 - c. **Identify** the natural science **principle(s)** that apply to your question and issue. For example, if your issue is global climate change, the principle you might identify is that the sun is the primary source of energy for Earth's climate system.
 - d. **Explain** how the **principle(s)** you identified apply to your issue and question. In other words, how are the natural science principle(s) you identified relevant to your question and issue?
- III. **Conclusion:** In this section, you will conclude your research investigation by discussing future directions for the debate on your issue. Specifically, you should:
 - a. Formulate a **hypothesis** that addresses the question you developed. Make sure your hypothesis is based on your investigation of your question.
 - b. Explain how a **natural scientist** would go about collecting evidence to support or refute the hypothesis you formulated. In other words, what would the next steps be if a natural scientist were to continue researching your hypothesis? Make sure to support your response with the natural science resources that you selected.
- IV. Provide a **reference list** that includes all of the science resources you used to investigate your issue and question. Ensure that your list is formatted according to current APA guidelines (or another format, with instructor permission).

Project Part One Rubric

Guidelines for Submission: Your planning document should be 3–5 pages, double spaced, with 12-point Times New Roman font and one-inch margins. You should use current APA guidelines (or another format approved by your instructor) for your citations and reference list.

Critical Elements	Exemplary (100%)	Proficient (85%)	Needs Improvement (55%)	Not Evident (0%)	Value
Introduction: Issue	Meets “Proficient” criteria, and description is exceptionally clear and contextualized	Describes selected issue in natural sciences and its significance	Describes selected issue in natural sciences and its significance but with gaps in detail or clarity	Does not describe selected issue in natural sciences and its significance	9.5
Introduction: Science Resources	Meets “Proficient” criteria, and description of resources demonstrates strong understanding of information needed to investigate issues in the natural sciences	Describes at least three relevant and appropriate science resources that could be used to investigate selected issue	Describes at least three science resources that could be used to investigate selected issue but with gaps in appropriateness, relevance, or detail	Does not describe at least three science resources that could be used to investigate selected issue	9.5
Introduction: Specific Question	Meets “Proficient” criteria, and response demonstrates insight into connection between research and question	Develops specific question related to selected issue and based on review of science resources	Develops specific question related to selected issue, but question is not based on review of science resources	Does not develop specific question related to selected issue	9.5
Body: Audience	Meets “Proficient” criteria, and identification of audience demonstrates insight into issue and question	Identifies an audience that would be interested in issue and question, citing source(s)	Identifies an audience, but audience is not appropriate for issue and question, or there are gaps in citation	Does not identify an audience	9.5
Body: Message	Meets “Proficient” criteria, and response demonstrates sophisticated understanding of how to effectively communicate with specific audience	Describes how and why message can be tailored to audience, providing specific examples and citing source(s)	Describes how and why message can be tailored to audience but with gaps in examples or citation	Does not describe how and why message can be tailored to audience	9.5
Body: Identify Principle(s)	Meets “Proficient” criteria, and response demonstrates insight into essential natural science principles	Identifies natural science principle(s) that apply to issue and question, citing source(s)	Identifies natural science principle(s) that apply to issue and question but with gaps in accuracy or citation	Does not identify natural science principle(s) that apply to issue and question	9.5
Body: Explain Principle(s)	Meets “Proficient” criteria, and response demonstrates insight into essential natural science principles	Explains how identified principle(s) apply to issue and question, citing source(s)	Explains how identified principle(s) apply to issue and question but with gaps in detail, clarity, or citations	Does not explain how identified principle(s) apply to issue and question	9.5

Critical Elements	Exemplary (100%)	Proficient (85%)	Needs Improvement (55%)	Not Evident (0%)	Value
Conclusion: Hypothesis	Meets "Proficient" criteria, and response demonstrates understanding of scientific thinking	Formulates hypothesis that addresses question and is based on investigation of question	Formulates hypothesis that addresses question, but hypothesis is not based on investigation of question	Does not formulate hypothesis that addresses question	9.5
Conclusion: Natural Scientist	Meets "Proficient" criteria, and response demonstrates understanding of scientific thinking	Explains how a natural scientist would go about collecting evidence to support or refute hypothesis	Explains how a natural scientist would go about collecting evidence to support or refute hypothesis, but explanation has gaps in clarity, detail, or logic	Does not explain how a natural scientist would go about collecting evidence to support or refute hypothesis	9.5
Reference List		Provides reference list that includes all science resources used to investigate issue and question, and list is formatted according to current APA guidelines (100%)	Provides reference list that includes all science resources used to investigate issue and question, but list has gaps in adherence to current APA formatting guidelines	Does not provide reference list that includes all science resources used to investigate issue and question	9.5
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
Total					100%