Nuclear Energy Sources Research Project Guide

Semester Final Project

Instructions: Throughout your project, you will use this document to guide you as you work on your project. You will add to this document and submit it for your Project Check-In assignments. Before beginning, please review the Sustainability Project Overview for important information and to help you get started.

- For this project, you will need a minimum of 5 reliable sources.
    - You may use JSTOR, Google Scholar, and other credible/academic sources to find research about the topics selected, fission, fusion, and radioactive decay.
    - You will need to Include the title, author/creator, explain where you found the information (insert a link for internet-based sources), and summarize some information you found from the source.
- Follow this project guide as you work on your project each week. You must follow the instructions in each section and submit this guide as evidence of your progress.

Week 1 Define the Problem

Due Date (TBA)

What problem will you investigate related to energy needs and human impact in your local area? For example, coal-fired power plants? Why is it harmful to the environment? Why is it harmful to animals? In what ways is it impacting your community? Why do you want to help reduce this problem in your local area? How can the reduction of the problem be made using nuclear energy sources, fission, fusion, or radioactive decay?

Sustainability consists of fulfilling current generations' needs without compromising future generations' needs while ensuring a balance between economic growth, environmental care, and social well-being.

In the box below, write 250-500 words double-spaced about the problem, why it matters, and why it is essential to you, your local community, and society.

Sample Problem Statement

Several environmental problems should be addressed, and one essential category is carbon emissions. More than a few problems stem from carbon emissions and their effects on our planet, but one, in particular, is related to our survival. It is that the balance has shifted in our atmosphere. As levels of carbon dioxide increase, oxygen levels in our atmosphere decrease. Many aquatic and terrestrial organisms on Earth require oxygen for functionality and survival. Other things keep us alive; however, we need oxygen before considering nutritional sustenance, water, and habitat needs. Essentially, the other environmental problems do not matter if we do not have air to breathe. As our oxygen levels are depleted in our growing society, energy needs and carbon emissions are a problem that needs to be addressed, especially considering not only do we exhale carbon dioxide regularly but that we put it into the atmosphere, oceans, and other spheres through burning fossil fuels, for example. While this is a global issue that we need to investigate and remediate, every community can offer something of a solution to this problem. In our community of Las Vegas, Nevada, we can take measures to address this problem with our energy production and consumption. We don't need to dedicate most of our time or make drastic choices, but reasonable energy production shifts can go a long way and significantly reduce our environmental impact.

Your problem statement

After finishing this section, submit a link to this document in Canvas for your Project Check-In.

Weeks 2-3 Research Your Topic

Through your research, answer the following questions:

- How can this problem be addressed? (the problem must be explicitly stated and related to the problem statement from week 1)
- What are the energy needs of your community?
- How are those energy needs currently being met?
- What has already been done to reduce carbon emission impact in your area?
- What issues might arise in the future? How will challenges be met?
- Additionally, consider the following; In what ways can nuclear energy solve the issues in your local area?
- What type of nuclear energy will serve as the baseline for comparison?
- What are the criteria and constraints of the energy source selected (fission or fusion)?
- How does radioactive decay compare to a selected nuclear energy source?

Fill in the tables below with the resources you have found, along with notes from each source. For your notes, you need to include the following:

- 1-3 quotes from each source cited correctly in MLA format
- Notes from each source of information you found that connects to your problem. Minimum of 7 sentences per source
- Summary - in your own words, explain what you learned about your topic. The summary should be at least five sentences.
- All sources should be no more than ten years old, i.e., from 2014 forward.

Be sure to address the following questions in your research.

What tipping points are associated with your local community/country?

- State a minimum of one tipping point.
- Explain what it is and why/how your community is contributing.

How can your community be impacted by a minimum of three tipping points?

- Give at least two specific examples of community impact for each tipping point selected.
- Why is it essential to reduce the probability of this occurring?

Tipping points are ecological thresholds that, once reached, cannot be undone. If these tipping points are reached, there will be catastrophic impacts on humans and society. Today these tipping points include the reduced or halted Atlantic Meridional current, the disintegration of the west Antarctic ice sheet, the Amazon rainforest dieoff, the West African monsoon shift, and several other tipping points. To learn more about tipping points, please review the following resources Nine tipping points that could be triggered by climate change, and The climate tipping points that could change the Earth forever

Source Title (5+ sources required)	**Author/Creator**	**Where you found this source MLA formatted citation**
Sample Nuclear Chemistry Chemistry: The Central Science	Brown, LeMay, Bursten, Murphy, and Woodward	Brown, p. “21: Nuclear Chemistry.” *Chemistry LibreTexts*, 16 June 2022, chem.libretexts.org/Bookshelves/General_Chemistry/Map%3A_Chemistry_-_The_Central_Science_(Brown_et_al.)/21%3A_Nuclear_Chemistry.
1.		Click here
2.		Click here
3.		Click Here
4.		Click Here
5.		Click Here
Additional Sources (optional)		Click Here

Add Research Notes Below:
Source #1 NOTES:
Source #1 SUMMARY:
Source #2 NOTES:
Source #2 SUMMARY:
Source #3 NOTES:
Source #3 SUMMARY:
Source #4 NOTES:
Source #4 SUMMARY:

Add Research Notes Below:
Source #5 NOTES:
Source #5 SUMMARY:
Source #6 NOTES: (optional)
Source #6 SUMMARY:(optional)

When you have finished this section, submit a link to this document in Canvas for your Project Check-In.

Week 4-6 Rough Draft Research Paper

Introduction Problem statement page - formula on how to write it

A problem statement is a concise and concrete summary of the research problem you seek to address. It should:

Contextualize the problem. What do we already know?
Describe the exact issue your business product or service will address. What do we still need to know?
Show the relevance of the problem. Why do we need to know more about this?
Set the objectives of the business proposal. What will you do to find out more?

Sentence stems to help you get started

- If (problem) is not solved, then (the consequence of not addressing the problem) will happen.
- (Who) will be most affected by the consequences if the problem is not solved?
- Does the problem have a broader relevance? Are there similar issues in other areas? What are those areas doing to address the problem?

Use short paragraphs and bullet points for it to be easy to read

Background information page(s) (research on the topic)

- Your problem statement should be at least one page, double-spaced.

- The background information should be a minimum of 2 pages typed double-spaced. Paragraphs should be easy to read for a person visiting your website.
    - What is the problem? (Begin with the problem statement created).
    - How is it impacting the local community
    - How can this problem be addressed? (the problem must be explicitly stated and related to the problem statement from week 1)

Body - Solutions to the problem statement. Include at least two versions of the proposed solution answering the following questions:

- What are the energy needs of your community?
- How are those energy needs currently being met?
- What has already been done to reduce carbon emission impact in your area?
- What issues might arise in the future? How will challenges be met (nuclear energy)?
- Additionally, consider the following; In what ways can nuclear energy solve the issues in your local area?
- What type of nuclear energy will serve as the baseline for comparison?
- What are the criteria and constraints of the energy source selected (fission or fusion)?
- How does radioactive decay compare to a selected nuclear energy source to solve the problem of carbon emissions?

This section should be the longest portion of your paper for a total of 3 pages minimum, typed double-spaced.

Sample sentence stem– When (proposed solution) is implemented, then (result) will happen based on the changes. For example, When nuclear fission as an energy source is implemented and provides 20% of local energy needs, then the amount of carbon emissions in the atmosphere will decrease by up to 100 metric tons annually. Solutions should be based on your research. Modifications of previous solutions in other areas or countries can be redesigned to fit your local area.

Impact of the proposed solution - The description should be at least three paragraphs. The solution should include who/what will benefit, how the proposed solution will impact the environment, and address the questions listed above.

Conclusion

The conclusion should tie all the sections together and include your options and which you feel would be most beneficial to your local community and society.

Once you complete your Google document, submit a link to your document in Canvas for your Project Check-In. This is your research paper rough draft.

Week 7 Final Draft Research Paper

Revise and polish your paper. Before submitting, be sure to check over the rubric for the following:

- Grammar, spelling, and punctuation errors
- Make sure all sources are cited correctly on each page
- Details of the solution(s) are logical and scientifically feasible.
- Are there any fun facts that you would like to include?

Once your revisions have been created, submit a link to your Google document in Canvas for your Final Project Check-in.

References

McSweeney, R. (2022, July 22). *Explainer: Nine "tipping points" that could be triggered by climate change*. Carbon Brief. https://www.carbonbrief.org/explainer-nine-tipping-points-that-could-be-triggered-by-climate-change/

Grist. (2021, April 29). *The climate tipping points that could change the earth forever*. YouTube. https://youtu.be/j3q7j8igyN4