

AP STATISTICS RESEARCH PROJECT PART I: GUIDELINES FOR PROJECT PROPOSAL

Due Dates:

- Topic Selection – Due via email (karen.cheng@knoxschools.org) by Tuesday, June 30th.
- Rough Draft – Due via email by Friday, July 31st, 11:59PM (Send as .pdf/.doc only.)
- Final Draft – Due via email or Canvas by Friday, August 14th, 11:59PM (.pdf/.doc)

Directions:

Carefully choose a topic of which you have a genuine interest. Keep in mind that this is an ongoing research project that you will “re-search” throughout the yearlong course, as you become familiar with a wide range of statistical concepts.

This first part (Part I) of the research project is to create a project proposal detailing an area of interest that you wish to study throughout the year. Parts II and III will take you through your experimental design and analysis of data collected. Part IV will take your research findings and prepare you for scientific presentation at an academic conference.

Answer all sections in complete sentences, in paragraph form. Remember that your proposal is a flowing document, not just a list of answering question prompts. Elaboration is necessary for establishing a compelling proposal. If you know of another student who is also taking this course, you may work together. However, all group members are responsible for submitting their individual work. You cannot have more than four members in a group.

You are welcome to contact Ms. Cheng via email at *any time* during the summer with questions or if you need someone to look over any ideas or drafts on your research.

Note: If you are a senior taking this course, you may want to consider choosing a topic that is related to your Senior Out of School Experience field or your STEM 4 Capstone. Please verify your topic of interest with Ms. Cheng and your STEM4/SOSE teacher before you continue.

Topic Selection:

Due Tuesday June 30th via email.

Send an email to Ms. Cheng (karen.cheng@knoxschools.org) with the following:

Email Subject: AP Stats Research Project Topic

- Your Name:
- Group Members’ Names (if applicable):
- Grade, Class:
- Topic: (*in 3-4 sentences, briefly describe the nature of your research topic*)
- Reasoning: (*in 2-3 sentences, briefly describe why you chose this topic*)

A list of example topics is included in the next page. Your topic **MUST** be approved prior to completing your project proposal.

EXAMPLE TOPICS FROM PREVIOUS YEARS

The following are sample topics from students' research. They are provided here to help you brainstorm topics of your own interest. You are certainly not limited to the topics or categories listed here. These were just topics that were chosen by students who have taken this course in the past two years. You may not replicate a topic listed here, but you may research on another topic in the same field.

Category: Sports

- Correlation Between College Team Ranking & Placement in NFL Draft
- Trends in College Sports and Pursuing Professional Careers

Category: Human Rights & Local Community

- Exploration of High School Students' Perceptions on Feminism
- Correlation Between Church Debt and Church Attendance
- Relationships Between College Student Religion and Education
- Relationships Between Gun Violence and Demographics

Category: Biology

- Trends in Dirtiness in Locations Around the L&N STEM Academy
- Comparison of Western Lowland Gorillas In-Habitat and In Captivity
- Relationships Between Age, Exercise, and Body Mass

Category: Video Games

- Correlation Between First Blood and Winning Matches in DotA 2
- Comparison of Performance in Casual vs. Competitive Play in League of Legends
- Relationships Between Toxicity and Game Communities

Category: Transportation

- Impacts on Car Models and Gas Mileage
- Relationships Between Performance, Materials, and Design of Paper Airplanes
- Global Traffic Systems vs. Traffic Congestion Times

Category: Psychology

- Relationship Between Music Genres and IQ
- Relationships Between Work, Social Life, and Academics
- Effects of Caffeine on Work Efficiency
- Correlation Between Attending a STEM School and Pursuing a STEM Career

Don't forget to submit your topic selection to Ms. Cheng by June 30th.

COMPONENTS OF THE PROJECT PROPOSAL

Please clearly label each of these sections as you prepare your project proposal drafts.

COVER: *Include the following on your cover:*

- Project Subject/Title:
- Student Name:
- Class:
- Group Members (if applicable):

INTRODUCTION: *Provide an overview of your research project. Use the following question prompts as guidelines for your discussion. Elaborate when possible.*

1. What is your research project about, and why did you choose this topic?
2. What goals do you plan to accomplish with this research?
3. What impacts could your findings in this research entail?
4. Why is your project a good topic in relation to the field?
5. What general methods will you use to conduct your research?
6. What measures (quantitative, qualitative) of data do you expect to retrieve?

LITERATURE REVIEW: *Provide the background and supporting information for your project. You should use at least 5 reputable, peer-reviewed sources. See Literature Review slides file for more information.*

1. What prior research has been performed regarding your topic?
 2. What current research is being done in the field of your topic?
 3. What kind of data is available for you to analyze from prior research?
 4. What are methods or aspects of experimental design that you must investigate to perform the research on your topic?
- Do NOT forget to include a bibliography for citations used. Use APA format.

PROPOSED METHODOLOGY: *Thoroughly describe your planning for the research. See Methods Info slides for more information/help.*

1. What tasks do you need to perform to carry out your research and data collection?
2. What materials will you need to carry out your research? Budget, if applicable?
3. How might you analyze the data that you have collected?
4. What time frame do you think you will need to accomplish all of your tasks?
5. Within your group, who will perform which task(s)?

ADDITIONAL INFORMATION, NOTES:

1. What assumptions do you have to make before conducting your research?
2. What are potential limiting factors to your research?
3. What challenges do you predict encountering in your research?
4. How do you plan on overcoming factors discussed in #2 & 3 for your research?

AP Statistics Research Project

Part 1: Project Proposal – Grading Rubric

Criteria	5	4	3	2	1
Professionalism – <i>Overall compilation and presentation of final, revised product as reputable academic researchers</i> <i>(20pts)</i>	Final draft of project proposal is professional and includes all three sections clearly labeled (introduction, literature review with bibliography, methods, & additional info if applicable.) Final PP is polished with little to no grammatical mistakes, using appropriate research language.	Final draft of project proposal is professional and includes all three sections clearly labeled (introduction, literature review with bibliography, methods, & additional info if applicable.) Final PP has few grammatical mistakes, and may have some colloquial language.	Final draft of project proposal is professional and includes all three sections, but may not be clearly labeled. Final PP has few grammatical mistakes and some colloquial language.	Final draft of project proposal includes all three sections, but may not be labeled. Final PP has frequent grammatical mistakes and significant use of colloquial language.	Final draft of project proposal is unprofessional and does not demonstrate completion of all three mandatory sections. Final PP may continually demonstrate grammatical errors and unprofessional language.
Design – <i>Planning and justification of experimental design, with agenda for carrying through the research project</i> <i>(20 pts)</i>	Project proposal demonstrates thorough planning, stating significance and reasoning behind performing the study or experiment. Methodology is detailed with specific tasks and timeframe for completion. Materials, data collection, and additional resources are discussed, and several connections are drawn to prior research to justify the experimental design.	Project proposal demonstrates thorough planning, stating significance and reasoning behind performing the study or experiment. Methodology clearly outlines specific tasks and timeframe for completion. Materials, data collection, and additional resources are discussed, and some connections are drawn to prior research to justify the experimental design.	Project proposal demonstrates adequate planning, stating significance and reasoning behind performing the study or experiment. Methodology briefly describes general tasks and timeframe for completion. Materials, data collection, and additional resources are mentioned, but no reasoning is provided behind experimental design.	Project proposal demonstrates some planning, briefly mentioning reasoning behind performing the study or experiment. Methodology briefly describes general tasks to be completed, without a timeframe. Materials, data collection, and additional resources are mentioned. No justification for experimental design is provided.	Project proposal does not demonstrate planning, or reasoning behind performing the study or experiment. Methodology mentions general tasks to be completed. No justification for experimental design is provided.

AP Statistics Research Project

Part 1: Project Proposal – Grading Rubric

<p><i>Inquiry & Critical Thinking – Investigations beyond the scope of the research project topic, implications for future prospects</i></p> <p><i>(30 pts)</i></p>	<p>Project proposal investigates additional assumptions, limiting factors, and sources of bias that may occur throughout the research. The authors explicitly discuss methods for troubleshooting and address the limitations to the experiment, with implications and suggestions for future research or improvement.</p>	<p>Project proposal investigates additional assumptions, limiting factors, and sources of bias that may occur throughout the research. The authors briefly discuss the limitations to the experiment, with implications and suggestions for future research or improvement.</p>	<p>Project proposal investigates some additional assumptions, limiting factors, and sources of bias that may occur during research. The authors briefly discuss the limitations to the experiment, but do not provide implications or suggestions for future research or improvement.</p>	<p>Project proposal investigates some sources of bias that may occur during research. The authors briefly discuss the limitations to the experiment, but do not provide implications and suggestions for future research or improvement.</p>	<p>Project proposal does not demonstrate thinking beyond the scope of the research project topic and fails to consider the possibility of failure in experimental design.</p>
<p><i>Collaboration – Demonstration of appropriate acknowledgement of parties involved both directly in the research project as well as through citation and reference.</i></p> <p><i>(10 pts)</i></p>	<p>Project proposal discusses the individual roles of each group member in detail, indicating specific tasks to be completed. In addition, research from additional sources or related projects are discussed and provided appropriate citation in correct APA format.</p>	<p>Project proposal discusses the individual roles of each group member, indicating general tasks to be completed. In addition, research from additional sources or related projects are discussed and provided appropriate citation in correct APA format.</p>	<p>Project proposal discusses the individual roles of each group member, and tasks to be completed are briefly discussed. In addition, research from additional sources or related projects are discussed and provided some citation, but not necessarily in APA format.</p>	<p>Project proposal discusses the roles of group members as a whole, but does not discuss any tasks to be completed. Research from additional sources or related projects are briefly discussed and do not have appropriate citation.</p>	<p>Project proposal does not the roles of group members and does not discuss any tasks to be completed. Research from additional sources or related projects are briefly discussed and do not have any citation.</p>
<p><i>Innovation – Establishing connections between research</i></p>	<p>The authors provide significant insight to the significance of both the research</p>	<p>The authors provide insight to the significance of both the research topic as</p>	<p>The authors provide insight to the significance of both the research topic as</p>	<p>The authors provide some insight to the significance of the research topic. The</p>	<p>The authors do not provide insight to the significance of the research topic. The</p>

AP Statistics Research Project

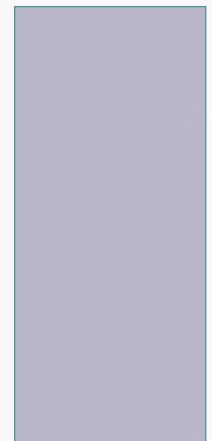
Part 1: Project Proposal – Grading Rubric

discipline and impacts in society beyond the experiment (20 pts)	topic as well as implications for potential findings from the research project. Substantial justification for the value of the research project is established, with clear description of project goals and connection to the field of the research topic. The project proposal also draws connection between potential findings and implications for the topic area in the future and impacts on society.	well as implications for potential findings from the research project. The value of the research project is established clearly, with a sufficient description of project goals and connection to the field of the research topic. The project proposal also briefly makes some connection to potential impacts on society.	well as implications for potential findings from the research project. The value of the research project is established clearly, with a description of project goals and connection to the field of the research topic.	value of the research project is briefly discussed, with a description of project goals and vague connection to the field of the research topic.	value of the research project is seldom discussed, with no descriptions of project goals and no connection to the field of the research topic.
Totals:					
				Project Proposal Final Draft Grade	/100

Part 1 Total Score	Grade	Total
Rough Draft	/50	
Final Draft	/100	
		/150

AP STATS RESEARCH PROJECT

LITERATURE REVIEW GUIDE



LITERATURE REVIEW

- *Background, supporting information for your project:*
 - What prior research has been performed regarding your topic?
 - What is the current research or status of your topic?
 - What have other researchers investigated and discovered regarding your topic?
 - What kind of data is available for you to analyze from prior research?
 - What are methods or aspects of experimental design that you must investigate to perform the research on your topic?
- ◆ **Do NOT forget to include a bibliography for citations used!**

STEP BY STEP GUIDELINE

- **Step 1** – Review APA format guidelines
 - <http://owl.english.purdue.edu/owl/resource/560/01/>
- **Step 2** - Familiarize yourself with online databases for scientific research journals and peer-reviewed literature and articles
 - Ex: JSTOR, ScienceDirect, SpringLink, Wiley Online, etc.
 - Google Scholar is also an acceptable search engine.
 - Keywords are very important! Note which you use.
 - Check dates on articles

GUIDELINES CONTINUED

- **Step 3** – Analyze the literature collected
 - A) Overview the articles
 - B) Group the articles into categories
 - C) Take brief notes on the articles; careful about quoting*
- **Step 4** – Create a concept map or outline that organizes the articles you found useful (you may choose to discard ones that end up being irrelevant to your research)
- **Step 5** – Review & answer the questions from the first informational slide.
- **Step 6** – Construct a bibliography in appropriate APA format.



Refining your Search...



Gain a general understanding of your topic so that you can determine appropriate key words. Wikipedia is a wonderful place to start—just don't end there. Look for the important terms being used. These will be your initial keywords

Too many hits?



Not enough hits?

Narrow your search by some of the following:

- Adding an additional search term or two
- Adding a NOT operator
- Going to advanced search settings

Broaden your search by some of the following:

- Removing a search term
- Simplifying a search term or two
- Using a wild card operator



AP STATISTICS RESEARCH PROJECT

Project Proposal: Methods



What's the Methods section about?

- Demonstrate to whomever is providing funding or approval for your research that you've put detailed thought on **what you need to do to carry out your research successfully.**
- Describe **tasks, resources, budget plan** (if applicable), **data collection/analysis**, and an **estimated time frame** for completing your research.



- **Basically**...an outline of how you have planned your research project.
- **Empathize from the approver's POV:** If someone is proposing a project that demonstrates little thought or planning...is that project worth funding or for spending time/resources? Is it a good investment?



IMPORTANT: Read below before you waste time doing more than you have to!

- Your methods shouldn't be more than 300-400 words long. It can be shorter and concise!
- It is perfectly OK if what your true experimental methods are not exactly the same as what you plan to do in your Proposed Methods.
 - ✓ Just remember to take notes on differences and be able to explain.



Guiding Questions

1. What tasks do you need to perform to carry out your research?
2. What materials will you need to carry out your research? Budget plan?
3. What tasks must you perform to carry out your data collection?
4. How might you analyze the data that you have collected?
5. What time frame do you think you will need to accomplish all of your tasks?
6. Within your group, who will perform what tasks?

*Note: A budget plan may not apply to your projects. Disregard if unnecessary.



Additional Discussion

- Underlying **assumptions** of your research project
- Potential **limiting factors**
- **Confounding** or **lurking variables** that will affect your data
- Other sources of **bias**



Finished with Methods?

- Check feedback from Ms. Cheng
 - If you didn't submit any rough drafts then you won't have have any feedback, of course...
 - You're always welcome to email Ms. Cheng at any time with drafts or questions.
- Start pulling everything together for your final draft Project Proposal
 - Check Grading Rubric & Guidelines
- Review & revise!
 - Don't turn in something you wouldn't be proud of.