

# Research Poster Project

**Course:** Math Academy I

**Chapter:** Nine

**Assigned:** Monday, May 1

**Due:** in 12 parts, from May 4 to May 25

**Worth:** 50 points per person

**Groups Allowed:** 1 team

**Summary:** Do a formal social science research paper, and present it in a research poster.

**Bonus:** The lead author can give up to +60%, split up between group members however he or she sees fit based on how much different group members contributed.

## The Lead author

The team's lead author oversees the project overall and makes sure everything happens as needed. This should be someone who is a leader, is very organized, and is task-oriented.

## Directions for the Lead Author

1. Choose a second author who shares the same qualities of lead author, above, works well with you, and can take over as needed.
2. Assign one task to each person on the team other than yourself. Write their names on the task assignment sheet, and turn it in. Each team member needs at least one section.
3. Create a Google doc titled "Project 9 \_\_\_\_\_", with your team name in the blank, and share it with each team member.
4. Before each task's due date, meet with me and the person in charge of the task.
5. Make sure that each task is completed on time, titled within the Google doc, and in order.

## Directions for Other Group Members

Carefully read the directions for your task, consult with me and the lead author before the due date, and type your task (unless it is the poster) into the Google doc after the previous task.

## Due Dates

On or before the due date, the lead author meets with me to show the finished section in the Google doc and receive feedback and a score. Work may be submitted late for partial credit until the following due date, but it will not receive feedback.

## Resubmission

Any section turned in on time can be resubmitted with the next section due for up to 9 points.

## Overall

Each person receives his or her own score on the project:

- double the score of the task he or she is in charge of
- double the average score, up to 10, of all sections [A] through [I]
- double the score on [J] Paper
- the score on [K] Poster Content
- the score on [L] Poster Layout

Each task has the potential for scoring higher than 10 if done remarkably well, but this is a high bar and should not be assumed.

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**[A] Hypothesis****Wednesday • 5/3**

1. Choose a scientific theory that interests you.
2. Find two or more scientific journal articles relating to the theory.
3. Have someone knowledgeable in that field help you understand the concepts and jargon in the articles.
4. Develop a new, testable, hypothesis based on what you read.
5. Summarize the articles in enough detail to justify the hypothesis.

- >10 The hypothesis is clever and novel and is clearly based on the studies read and the summaries of them.
- 10 The hypothesis is reasonable based on the studies read and the summaries of them.
- 8-9 The hypothesis is loosely based on the studies read and the summaries of them.
- 5-7 The hypothesis is loosely based on the studies read but the summaries do not convey this.
- 1-4 The hypothesis is not based on studies.
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**[B] Introduction****Thursday • 5/4**

1. Introduce the topic.
2. Discuss the journal articles. Use APA notation to cite them.
3. State the hypothesis, and use the discussion of the articles to explain why the theory would predict the hypothesis to be true.

- >10 The introduction clearly conveys the studies that were read and how they lead to the hypothesis, and they are correctly cited in APA format.
- 10 The introduction conveys the studies that were read and how they lead to the hypothesis, and they are cited in APA format.
- 8-9 The introduction conveys the studies that were read and how they lead to the hypothesis.
- 5-7 The introduction mentions the studies that were read and the hypothesis.
- 1-4 The introduction does not convey the studies that were read or does not convey the hypothesis.
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**[C] Design****Friday • 5/5**

1. State whether the experiment will be experimental, quasi-experimental, or neither.
2. State whether the design will be between-participants or within-participants, if applicable.
3. State the independent variable and, if discrete, its levels.
4. State the conceptual dependent variable and how you will measure it.
5. Decide what type of statistical test you will use.
6. Decide which tail the test will use.

- >10 All six aspects of the design, as listed above, are carefully chosen, and the measured dependent variable is clearly valid and reliable.
- 10 All six aspects of the design, as listed above, are reasonable.
- 8-9 One or two aspects of the design are significantly inappropriate for the study.
- 5-7 Three or four aspects of the design are significantly inappropriate for the study.
- 1-4 The design is likely not to work for the study.
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**[D] Participants****Monday • 5/8**

1. State the sample (e.g., a freshman Biology class), and summarize it with respect to age, race, and sex.
2. Schedule time(s) to collect data from them. If you will be collecting data from a class, have the teacher email me to confirm the time.
3. If you are doing an experimental design, precisely explain how you will do random assignment.

- >10 The participant list is appropriate for the study in terms of both type of participant and sample size, the data collection plan is reasonable and has been confirmed by all parties involved, and if the study is an experiment the method of assignment of participants to conditions is without confounds.
- 10 The list, plan, and method of assignment (if applicable) are reasonable, and data collection has been confirmed by all parties involved.
- 8-9 The list, plan, or method of assignment (if applicable) is questionable for the study.
- 5-7 The data collection has not been confirmed.
- 1-4 The list or plan likely will not work for the study.
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**[E] Procedure****Tuesday • 5/9**

1. Write a step-by-step procedure of exactly how you will collect the data.
2. If participants will be turning in written data, type a response sheet for them to write on.
3. Make an informed consent form that explains what the study is about and that any participant can stop at any time. Be sure the explanation is general enough that it does not give away aspects of the study you don't want them to know in advance. Provide a place for participants to sign that they are willing to take part in the study and understand they can stop at any time.
4. Prior to doing the pilot study, turn in a hard copy of the procedure and, if any, the response sheet.
5. Do a pilot study in which you carry out the procedure on one or more individuals per condition as if they were in the real experiment. Report the pilot study data.
6. Revise the procedure as appropriate based on how the pilot study went. Do another pilot study if you make major changes.

- >10 The written procedure is clear enough that someone could carry it out exactly the same just by reading it, changes have been made based on the pilot study, and the response sheets address the dependent variable as well as can be expected.
- 10 The procedure is clear in all crucial aspects, and the response sheets address the dependent variable reasonably well.
- 8-9 The procedure is clear in all crucial aspects, and the response sheets address the dependent variable.
- 5-7 The procedure is unclear in one or more crucial aspects, or the response sheets do not seem to address the dependent variable.
- 1-4 The procedure is very vague.
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**[F] Data Collection****Thursday • 5/11**

1. Have each student sign the informed consent form.
2. Carry out the experiment.
3. Describe any misunderstandings, possible confounding variables, or major extraneous variables that may have affected the results.
4. Create a Google sheet and type in the data in an appropriate format for the study. Add a link to this spreadsheet in your project document.

- >10 The data collection mostly goes as planned, any issues are carefully described, and the spreadsheet is easy to understand.
- 10 The data collection mostly goes as planned and the spreadsheet is understandable.
- 8-9 The data are of questionable use due to misunderstandings or a major confound, and these issues are carefully described.
- 5-7 The data are of questionable use due to misunderstandings or a major confound, and these issues are not carefully described.
- 1-4 The data may be unusable.
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**[G] Data Summary****Friday • 5/12**

1. Calculate each mean and standard deviation or each proportion, as appropriate.
2. Graph the data in an appropriate graph that is well labeled, scaled, and titled so that it can be quickly understood at a glance.

- >10 All relevant statistics are calculated, and the graph is an appropriate type and is labeled, scaled, and titled well so that it can be quickly understood at a glance.
- 10 All relevant statistics are calculated, the graph is an appropriate type and reasonably labeled, scaled, and titled.
- 8-9 All relevant statistics are calculated, and the graph is an appropriate type.
- 5-7 Not all relevant statistics are calculated or the graph is not an appropriate type.
- 1-4 The graph is not understandable.
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**[H] Statistical Inference****Monday • 5/15**

1. Calculate the statistic ( $z$ ,  $t$ ,  $r$ ,  $\chi^2$ , or  $F$ ) and the  $p$  value for the data. You can research how to do this in Sheets, or get outside help.
2. Report the conclusion of the study, including the calculated statistic and the  $p$  value.

- >10 The statistic and  $p$  value are calculated and reported correctly, and the conclusion is correct and worded precisely.
- 10 The statistic and  $p$  value are calculated and reported approximately correctly and, the conclusion is correct.
- 8-9 There is a significant error in the calculations, but it does not affect the conclusion.
- 5-7 The conclusion does not make sense.
- 1-4 The conclusion is opposite of what it should be.
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**[I] Discussion****Wednesday • 5/17**

1. Discuss the results in the context of the theory upon which the hypothesis was based. In what aspects did they turn out as expected or different from expected? What are some possible reasons for any differences? If you did not reject the null, do you think the hypothesis was incorrect or do you think you could redo the experiment, perhaps with a few changes (explain them) and a larger sample and reject the null? If you did reject the null, discuss the importance of the findings and possible new research based on the conclusion.

- >10 The discussion is analytical and insightful, and it directly relates the results to the underlying theory.
- 10 The discussion shows some insight and relates to the underlying theory.
- 8-9 The discussion relates to the underlying theory.
- 5-7 The discussion is analytical but does not relate to the underlying theory.
- 1-4 The discussion is very superficial.
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**[J] Paper****Thursday • 5/18**

1. Write a formal paper that recounts the study. Break the paper up into the following sections and label each: Introduction, Design, Participants, Procedure, Results, and Discussion. Include the statistics, graph, and conclusion in the Results section. Each section should be in past tense and in paragraph form, including Participants and Procedure.
2. Verify that all symbols are displayed properly. You may use  $M$  and  $SD$  instead of  $\mu$  and  $s$ . Make sure all variables are italicized and numbers are not italicized.
3. Write a one-paragraph Abstract, to go before the rest of the paper, that summarizes the following in a sentence or two each: Introduction, Participants & Design, Procedure, Results, and Discussion.
4. Add a References section, to go at the end of the paper, that lists, in APA format, the studies you cited.
5. Proofread the paper. Make sure it flows well and is free of incomplete sentences, grammatical errors, spelling errors, typos, etc.
6. Have someone else proofread the paper.

- >10 The paper includes all relevant information from each section, reads well, is well formatted, and has almost no errors.
- 10 The paper includes all important information from each section, reads well, and has few errors.
- 8-9 The paper includes all important information from each section and is understandable.
- 5-7 The paper leaves out important information or is significantly unclear in sections.
- 1-4 The paper is significantly incomplete or is very poorly written.
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**[K] Poster Content****Wednesday • 5/24**

1. Discuss comments given on the Draft Paper with its author and other group members, and make changes as appropriate.
2. Proofread the Abstract.
3. Edit the Introduction down to a few paragraphs, and proofread it.
4. Combine Participants and Design into one section, edit it down to one or two paragraphs, and proofread it.
5. Edit the Procedure down to one or two paragraphs, and proofread it.
6. Edit the text of Results down to one or two paragraphs, and proofread it.
7. Verify that all symbols are displayed properly. You may use  $M$  and  $SD$  instead of  $\bar{x}$  and  $s$ . Make sure all variables are italicized and numbers are not italicized.
8. Show the graph to people not in this class and ask them to interpret the results. If they cannot, change the title, labels, etc. to make the graph more clear and repeat this step with new people.
9. Edit the Discussion down to a few paragraphs and proofread it.
10. Verify that the formatting of the References is all correct.

- >10 The poster conveys all important aspects of the study, is well written and easy to read, is well formatted with correct use of statistical symbols and italicized variables, and has almost no errors.
- 10 The poster conveys all important aspects of the study, is reasonably written and easy to read, is reasonably formatted with mostly correct statistical symbols and italicized variables, and has few errors.
- 8-9 The poster conveys most important aspects of the study, is decently formatted and readable, and has no major errors.
- 5-7 The poster conveys what you are studying, roughly how you did it, and an accurate conclusion.
- 1-4 The poster is significantly unclear, incomplete, or incorrect.
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## [L] Poster Layout

Wednesday • 5/24

1. Google “research poster” to see examples of research posters. If you get ideas from these that seem to work for your project better than the directions below, use them.
2. Center a bold title above each of the above sections (e.g., “Participants & Design”).
3. On separate pages, print each step listed above, with title, in landscape mode (horizontal paper). Use 18-point font or larger.
4. Paste each section onto colored construction paper.
5. Print or artistically write the project’s title, authors, “Scotts Valley High School” and “May 2016” in the middle of the top of the poster.
6. Pin the poster to the wall.

>10 The poster is consistently formatted throughout, is easy to follow, has a clear graph, and is neat and attractive.

10 The poster is easy to follow, has a clear graph, and is neat and attractive.

8-9 The poster and the graph on it are understandable and neat.

5-7 The poster and the graph on it are understandable.

1-4 The poster or the graph on it are difficult to understand.

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