

**K-8 CHPCS GUIDELINES FOR THE
Sally Ride Science and Engineering Exposition
SCIENCE RESEARCH AND ENGINEERING FAIR PROJECT
SCIENCE RESEARCH PROJECT TIMELINE
(ALL DOCUMENTS PRINTABLE AS PDF)**

approximate due date	Assignment use hyperlink or scroll down to information for each	Abbreviation
9/6/2012	Introduce parents/guardians to science research project at Back to School Night	SRSEE INTRODUCTION
9/10-13/2012	Project Intro in class	
10/10/2012	Project proposal	SRSEE 1
10/10/2012	Journal check 1	JC 1
12/3/2012	Three sources, hypothesis, draft of method	SRSEE 2
12/10/2012	Introduction, reference list	SRSEE 3
12/10/2012	Journal check 2	JC 2
12/11/2012	Materials and Methods	SRSEE4
12/18/2012	ISEF forms	SRSEE 5
1/10/2013	Photos and data/data collection	SRSEE6
1/10/2013	Journal check 3	JC 3
1/17/2013	Statistical Analysis - THIS IS OPTIONAL	SRSEE 7
1/23/2013	Results and Discussion	SRSEE 8
1/23/2013	Journal check 4	JC 4
1/30/2013	Conclusion	SRSEE 9
2/5/2013	Abstract and Final paper draft	SRSEE 10
2/5/2013	Journal check 5	JC 5
2/12/2013	Final Research Paper	SRSEE 11
2/13/2013	Poster Presentation in class	SRSEE 12
2/13/2013	Journal check 6	JC 6
2/19/2013	CHPCS SCIENCE FAIR	
3/22/2013	NWSE STATE SCIENCE FAIR	

last updated December 10, 2012
SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION
PROJECT GUIDE FOR K-8

The science research project is an incredible opportunity for students to integrate and put into action all they have learned in school and explore an area of interest. This project requires students to use skills in critical thinking, written and verbal communication, mathematical analysis, scientific method, graphic arts and computers. **Students in grades 4 through 8 will work individually or in groups of up to three. Students in Kindergarten through grade 3 will be completing the project as a class.**

Students will find a question of interest to investigate, develop a hypothesis or engineering goal, test the hypothesis, answer the question or solve the problem.

All students will present their project at the Cascade Heights Public Charter School Science and Engineering Fair in February. Fifteen qualifying projects from 5th through 8th grade will take their projects to the NWSE Intel Science Exposition (state science fair).

The school fair will follow the rules and regulations for the NWSE Intel Science Exposition. Students will complete the registration forms online at nwse.org. The rules will be reviewed in class, however it is important to note that **no experimentation may begin until all the proper forms are completed and signed.** Projects dealing with humans and other vertebrate animals require special review and approval. (Rules can be found at www.nwse.org)

This is a research-based fair, with projects that find or produce new knowledge about our world. Demonstrations, 'library' research, informational projects, 'explanation' models or kit building projects are not appropriate for research based science fairs. Each project will have a hypothesis or an engineering goal.

For more information on this type of project, go to the link:

<http://www.societyforscience.org/isef/document/hbk2009.pdf>

JOURNAL/PROJECT DATA BOOK

Each student in grades 4-8 must have a journal/project data book, which includes a documentation of all your work on this project. If you are working in a team, you must also

record the work done by your partner. It will include your thoughts on the project, notes on your research with references, and your raw data. Number all the pages in your journal and use the first two pages to create a table of contents. Each entry should be dated and noted in the table of contents. The journal should be a bound notebook such as a composition notebook. The journal will be part of the final project and is necessary for the NWSE Intel Science Exposition. Specific information and examples of what to include in your journal/logbook can be found at

http://www.sciencebuddies.org/science-fair-projects/printable_project_logbook.pdf

The journal will be assessed periodically when student meets with Mrs. Brunning.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION
(SRSEE) ASSIGNMENT #1
PROJECT PROPOSAL

Defining the question is probably the biggest hurdle in this project. Since it is a large

project, that consumes a considerable amount of time, it is important to find a topic of interest. Then it is less likely the project will seem like such a chore.

To find a topic, spend some time in the library, read some periodicals, check on the internet and talk with others. Check out www.sciencebuddies.org, go through the “Topic Selection Wizard” under “Science Fair Project Ideas”. This will help narrow down what you may find interesting. Projects are identified by difficulty level. You do not have to do the exact project they describe. You may use this site as a starting point and develop a project specific to your interest.

After you select an idea for your project, complete the **SCIENCE RESEARCH PROJECT (SRP) ASSIGNMENT #1** in your journal/project data book. Remember, this is a preliminary proposal, scientists expect to modify their procedures and ideas as they research and discover new information. You may have to adjust your plans as you conduct your background research. You may also need to modify your hypothesis. You may even decide to change your project topic.

The information you provide in this first assignment will help you with your next assignments. If you change your project after this assignment is completed, you will not need to redo this particular assignment, just note it in your journal. If you are working in a team each member must complete the assignment in their respective journal/project data book.

SUMMARY (SRSEE) ASSIGNMENT #1 PROJECT PROPOSAL

In your journal/project data book, please identify the following:

1. If you will plan to work individually or in a group(record names of group members)
2. **ISEF Category** – Select the appropriate category for your project from the list found on the state science fair web page at www.nwse.org.
3. **Title**- Choose something that is concise yet descriptive. This is not necessarily the title you will use, but it will give you a starting point.
4. **Question**-What problem are you trying to solve?
5. **Hypothesis or engineering goal**- Identify what you are testing or what you are trying to produce.
6. **Independent Variable**- What is the one thing that is being changed between the test and the control?
*If you are doing an engineering project you will not have one.
7. **Dependent Variable**-What is the one thing you are measuring to determine the difference between the test and control.
*If you are doing an engineering project you will not have one.
8. **Control**-Describe your control and list the things you must consider to hold constant
*If you are doing an engineering project you will not have one.
9. **Test**-Describe your test and what is the one thing that makes it different from the control. *If you are doing an engineering project you will not have one.
10. **Topics** that will be researched (key words/topics to use in a literature search)
11. **Summary of Proposed Procedure**-This is a brief summary of what will be done in this project
12. **Proposed Data Collection Table**- Draw a data table, with proper headings, which could be used to record your data. If you are doing an engineering project this table will contain data from trial runs.

REMEMBER NO EXPERIMENTS MAY BEGIN BEFORE THEY HAVE BEEN APPROVED.

SRSEE# 1 Project Proposal RUBRIC

achieved	Revise and resubmit	Project Proposal
		Assignment recorded in journal/project data book

		Indicates plans to work individually or with identified group members
		Indicates the appropriate ISEF categoryf or the project
		Possible title recorded
		Identifies appropriate question or problem that the project addresses
		Hypothesis or engineering goal is appropriate for question
		Independent variable identified (not used in engineering project)
		Dependent variable identified(not used in engineering project)
		Control group described(not used in engineering project)
		Test group described(not used in engineering project)
		Proposed procedure that addresses the hypothesis or engineering summarized
		headings of data table prepared and appropriate for the data to collect

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION
(SRSEE) ASSIGNMENT #2
HYPOTHESIS, DRAFT OF METHODS and SOURCES

Research projects typically begin with a literature search to find out what is already known about the topic and what investigations have been completed. To start your literature search you should write down (in your journal/project data book) a list of key words and ideas that you

already know about your subject. Then begin a search of literature using the internet, databases, science journals, science magazines, books and reference books.

You may also contact people or groups you know that are knowledgeable of your topic. You may conduct an interview to gather information or ask them to refer you to another source. Record notes and your reference information in your journal/project data book. Reference information includes notes from interviews, literature titles, authors, publisher, publication date, publication location, URL's and date accessed.

After gathering more information, you should have a clearer idea of how to proceed. You will write up the first draft of a detailed procedure that you plan to complete.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #2

HYPOTHESIS, DRAFT OF METHODS and SOURCES

After completing SRP #1, you have identified a topic, a question and a hypothesis or engineering goal. In SRP#2 you need to finalize your hypothesis or engineering goal and prepare a first version of your material list and your methods plan. Lastly, you need to list, in APA format, at least three sources you have found that relate to your topic. This assignment must be completed in your journal/project data book.

Hypothesis or Engineering Goal - This is your prediction about the outcome of the experiment. It may be helpful to write it as an if-then statement.

For an engineering project, you will describe what you plan to design.

Materials and Methods –Describe in as much detail as possible how you will collect your data or design your apparatus. The steps should be clear and explain the procedure so that someone else could follow the steps to duplicate your experiment. You may include labeled drawings.

You must have a minimum of 20 trials or test subjects in order to collect enough data.

The more trials you have the easier it will be to do the statistical analysis required for your discussion and conclusion. All measurements must be made using the Metric system.

Make a list of all the required materials for your project.

Sources-Your sources will be written in APA format and will be titled "References".

You need to find at least three sources of information pertaining to your topic

None of the sources may be encyclopedias.

All of the sources must be recent, less than 5 years

If you have a question about a source, please ask before the due date

SRSEE# 2 Hypothesis, Draft of Materials and Methods, Three Sources RUBRIC

achieved	Revise and resubmit	Hypothesis, Draft of Materials and Methods, Three Sources
		assignment completed in journal/project data book
		hypothesis or engineering goal
		materials list and description of the method to be used

		three sources written in APA format
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SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION
(SRSEE) ASSIGNMENT #3
INTRODUCTION & REFERENCES

The Introduction provides the purpose of the research and the question being investigated. It should explain what prompted the choice for this project. It should also give background information that explains the project and identifies the scientific concepts associated with this project. Other related research is presented and the relationship it has to your project is explained, including how your project expands on this research. You need to include your hypothesis and the logic behind how you reached your hypothesis or engineering goal. Give a brief overview of the project and identify the dependent (what you are measuring) and independent variables(change you are making). Also explain any unique procedures or uncommon terminology or math equations.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #3

INTRODUCTION & REFERENCES

For this assignment, complete your introduction and references. This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted.

Your introduction should be at least 250 words in length. It should be written in past tense and in third person. Here is a clarification on third person as taken from The Learning Centre of University of Southern Queensland (<http://www.usq.edu.au/learningcentre/tips.htm>).

"First, second and third person

A pronoun is a word that replaces a noun to save repetition of names or ideas. Writing in first person involves use of personal pronouns: I, me, my, mine, we, us, our. Writing in second person involves use of personal pronouns: you, your, yours. In most university assignments you will be asked not to use the first or second person, because they require you to write based on academically credible research rather than your personal experience. Academic writing generally uses what is called third person. Third person pronouns are: they, their, it, its.

examples

First person	Third person
Our earth	The earth
Our society	Australian society
I conducted research on the World Bank's policies	Research was conducted on the World Bank's policies.
You can find convincing arguments for the need to promote full employment	Social researchers have made convincing arguments for the need to promote full employment

Remember that you need to include citations in your introduction. All the sources cited must be in the "References" and all the references must be used in the citations.

SRSEE#3 Introduction and References Correction Rubric

achieved	Revise and resubmit	Introduction Criteria-not in any particular order
		Purpose of the research is clear, question or engineering goal is evident
		Background information necessary to explain the project is provided. Scientific concepts that project relates to are identified.
		Other related research is presented and the relationship it has to your project is explained, including how your project expands on this research.
		Explain the logic behind how the

		hypothesis or engineering goal was reached.
		Explain what prompted your choice of research project.
		Provide a brief overview of your project.
		The independent and dependent variable for your experiment are described.
		If there are unique procedures or uncommon terminology or math equations, those are explained.
		References Criteria
		Citations are included for every source of information. The citation should be located at the end of the sentence or paragraph and should be in the APA format (Author last name, year). Your paper should be full of citations.
		References should be typed in APA format and entries listed in alphabetical order and are not numbered.
		All sources listed in your References are cited in your Introduction, if not cited then they are not included.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #4

Materials and Methods

As was described in SRP#2, this section provides a detailed explanation of what you will do to complete the experiment or design your apparatus. Remember it must be detailed enough that someone could repeat your work by following your explanation. Number your steps and include labelled diagrams if necessary. Also, remember, the more test subjects you have, the more reliable will be your results. You should have a minimum of 20 test subjects.

When you list your materials, be sure to include sizes, amounts and numbers of each item, and only use metric units. Scientific names should be used for organisms. Do not number the items on your materials list.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #4

Materials and Methods

For this assignment, you will build on what you prepared in SRP#2 and finalize your methods and materials. This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted. It should be written in past

tense and in third person.

SRSEE #4 Materials and Methods Rubric

Achieved	Revise and resubmit	Materials criteria
		Materials presented in a list format
		Materials with any necessary details such as quantity, size given in metric, or type.
		Methods criteria
		Method presented in numbered steps
		Enough detail is provided so that this procedure could be repeated by the reader.
		Adequate number of test subjects(at least 20). If it is an engineering project this does not apply.

Forms

Projects that do not involve humans, pathogens, hazardous materials/ activities or vertebrates can use the MSEZ forms. The student name(s) and project category will be entered online and each student or group will be given a project number and password. To complete the form, log in to finish and verify the information.

If your project does involve humans, pathogens, hazardous materials/ activities or vertebrates require additional forms. The student name(s) and project category will be entered online and each student or group will be given a project number and password. Students must log in and complete all forms.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION **(SRSEE) ASSIGNMENT #5**

Forms

Complete all the necessary forms for your project. Forms will be completed online at nwse.org.

SRSEE # 5 Forms Rubric

Achieved	Revise and resubmit	FORMS
		ONLINE
		All necessary forms completed and submitted online
		OFFLINE
		All necessary papers signed and turned in to teacher

Photos and Data Collection

To help illustrate your work it is important to take photos of your set-up and experiment. The pictures will be used on your poster board for your presentation. The pictures can only show the face of someone if you have written permission to photograph them. You can avoid this by placing a black bar on the photo, across their eyes.

The data you collect should be recorded in your journal/project data book. Be sure to make your measurements using the metric system and record your data in a data table.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #6

Photos and Data Collection

For this assignment you turn in your journal/project data book with your collected data. Your photos can be printed and turned in or, to save ink and paper, they can be emailed me as an attachment or burned onto a CD. You should have at least four pictures that reflect your project and methods.

SRSEE # 6 Photos and Data Collection Rubric

Achieved	Revise and resubmit	Photos Criteria

		at least four photos
		photos reflect what project was about and methods involved
		Data Collection Criteria
		evidence of data is present in journal

Statistical Analysis

There may be a difference between your test and control, but how do you know if it is random variation or if it truly is a significant difference.

Because of the complexity, completing a statistical analysis is an optional assignment.

If you like to do it you can get help from Mrs. Brunning.

The analysis should include the null hypothesis, means, p-value, test results, and a statement about if it supports or refutes the null hypothesis.

<u>SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION</u> <u>(SRSEE) ASSIGNMENT #7</u> <u>Statistical Analysis</u>
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SRSEE #7 Statistical Analysis Rubric

Achieved	Revise and resubmit	Statistical analysis criteria
		Appropriate test selected (eg. t-test, chi-square test)
		Calculations shown and accurate

		Summary of statistical analysis (includes null hypothesis, means, p-value, test results, and supports or refutes null hypothesis)
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Results and Discussion

Results include an analysis of your data. Your data was recorded in your journal/project data book. In this assignment you will visually represent your data as graphs. You will also describe, in paragraph form, the trends you see. This is also the place for your statistical analysis, if you have one.

In your discussion, you will compare your results with what was expected. How did the test compare to the control. Was the difference between the test and control statistically significant?

You should also include a discussion of possible errors. What could have made your data unreliable? Were the results affected by anything unexpected? What would you do differently if you were to repeat this project? What other experiments could be conducted to further investigate your topic?

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #8

Results and Discussion

For this assignment, complete the Results and Discussion. This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted.

SRSEE#8 Results and Discussion Rubric

Achieved	Revise and resubmit	Results Criteria
		Data visually represented in graph form
		Graphs appropriately titled and labeled
		Trend described in paragraph form

		Statistical analysis summary
		Discussion Criteria
		Results compared with what was expected
		Comparison of test group and control group
		Discussion of statistical significance of results
		Discussion of possible sources of uncertainty
		discussion of what to do differently if repeated
		Discussion of other experiments that could be done to further investigate this topic

Conclusion

This is a short summary of what your results showed and how that related to your hypothesis. Was your hypothesis supported or refuted? Support your conclusion with your results and your statistical analysis if available. This information has been reported in your results and discussion, but in the conclusion, it is stated briefly and in relation to your hypothesis.

<u>SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION</u> <u>(SRSEE) ASSIGNMENT #9</u> <u>Conclusion</u> For this assignment, complete the Conclusion. This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted.	
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SRSEE#9 Conclusion Rubric

Achieved	Revise and resubmit	Conclusion criteria
		Hypothesis restated
		State whether hypothesis is supported or refuted (Engineering projects should state whether they met their design criteria)
		Conclusion supported with results and statistical analysis if available

Abstract

The abstract is a brief summary of your project, no more than 250 words. It has four basic parts; the purpose of the Experiment (include hypothesis or engineering goal), the procedures used, the results and the conclusion. Write a sentence or two about each part.

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT#10

Abstract

For this assignment, complete the Abstract. This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted.

SRSEE# 10 Abstract Rubric

Achieved	Revise and resubmit	Abstract criteria
		250 words or less
		Purpose of the project is introduced
		Hypothesis or engineering goal is identified
		Brief description (no details) of procedure
		Summary of results (give numbers)
		Relationship of results to hypothesis or engineering goal

Final Research Paper

FORMAT

You will use what you have completed in your previous assignments to put together your research paper. Organize your paper in the following manner:

Tables, Graphs & Illustrations/Pictures	Number all tables, graphs and illustrations/pictures in the order in which they are mentioned in your paper.
	Include the tables, graphs and illustrations in the text of your paper as appropriate.
	All tables and graphs should have a title
	All illustrations/pictures should have a caption.
Order of Major Sections	Each of these sections (if present) begins on a new page: •Title page •Table of contents •Abstract •Introduction •Methods •Results •Discussion •Conclusions •Acknowledgements •Reference List •Appendix
Format	Format paper according to the assessment rubric below.
For examples and more help with citations/references	Purdue University Online Writing Lab (OWL) - APA Style Guide

SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION

(SRSEE) ASSIGNMENT #11

Final Research Paper

For this assignment, you will put together the work of your previous assignments to complete your final research paper. Be sure to have all sections revised if necessary.

This assignment must be typed and turned in on the due date. If you are working in a team, only one copy, with all the team member names, needs to be submitted.

SRSEE#11 Final Research Paper Rubric

Achieved	Revise and resubmit	Format criteria
		Typed on 8 1/2 x 11 paper, one side only
		Page margins 1" on all sides (top, bottom, left, right)
		Font 12-pt. Times Roman or Courier. For figures, a sans serif font such as Arial is used.
		Double-spaced
		Text aligned flush left with uneven right margin
		Paragraph indent is 5 spaces
		One space left after period
		Table of contents appropriately formatted
		Title page appropriately formatted
		Tables and graphs titled
		Illustrations and photos have captions
		Major sections in proper order
		All major sections included in paper
		Content criteria – each section has the appropriate information and all revisions have been made.
		Title page
		Table of contents
		Abstract
		Introduction
		Methods
		Results
		Discussion

		Conclusions
		Acknowledgements (thank anyone who helped make your project happen)
		Reference List

Poster Presentation

Your final activity is to prepare a poster representing your project and present it to the class.

<u>SALLY RIDE SCIENCE AND ENGINEERING EXPOSITION</u> <u>(SRSEE) ASSIGNMENT #12</u> <u>Poster Presentation</u>
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SRPSEE # 12 Science Research Project Poster and Presentation

A summary of what components to include on your poster:

1. Title – This should reflect what your project is about.
2. Introduction to topic
3. Hypothesis/engineering goal -presented separate from the Introduction
4. Methods (includes materials list and step by step procedure)
5. Results with graphs/charts and descriptive paragraph. Do not include raw data.
6. Statistical Analysis (not included in engineering projects)
7. Discussion
8. Conclusion
9. Reference List
10. Pictures – at least four pictures with frames and captions. If a person's face is shown, you must have written permission to display it.

Presentation Expectations- Student will :

1. speak of project clearly and knowledgeably.
2. maintain eye contact with audience.
3. keep verbal tics to a minimum
4. explain why they chose the project
5. identify the hypothesis or engineering goal, the independent and dependent variable and the control.
6. summarize what was shown and if hypothesis was supported or refuted.
7. discuss any problems or errors that could have impacted the reliability of the data.
8. what could be done differently next time
9. what other research could be done related to this project.
10. If this is a group project, each member speaks equally

SRSEE#12 POSTER AND PRESENTATION RUBRICS

Poster Design

Achieved	Revise and resubmit	Poster with presentation
		Readable font
		Pictures framed
		Border
		Bulleted information
		Creative bullets
		Papers glued completely down
		Colors complement topic
		Alignment consistent
		Straightness – edges and item placement
		Appropriate use of white/empty space

PRESENTATION

Achieved	Revise and resubmit	Poster with presentation
		Interesting layout
		Pictures facilitated understanding
		Graph/charts easy to understand
		Engaging title
		Text on poster complements presentation
		Poster components presented in a logical manner
		All components included

Achieved	Revise and resubmit	Presentation with poster
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		Speaks clearly
		Group members present equitably
		Presentation builds on poster information
		Presenters appear knowledgeable in project area

Achieved	Revise and resubmit	Content
		Demonstrates understanding of project
		Hypothesis/engineering goal clearly identified along with independent and dependent variable and control
		Procedure summarized
		Graphs/charts explained
		Results summarized-was hypothesis supported or refuted
		Explains project difficulties and lessons learned
		"If I could do it over again, I would...."explained