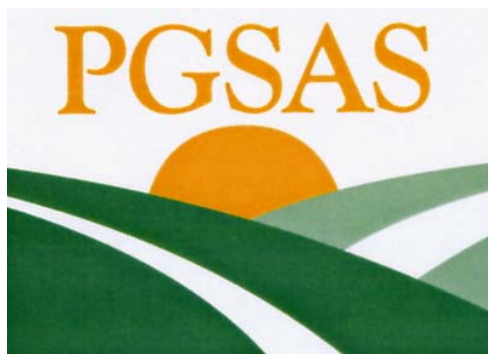


**PGSAS  
2008  
Independent  
Study  
Project  
Guidelines**

PGSAS

PENN STATE

PENNSYLVANIA GOVERNOR'S SCHOOL FOR THE AGRICULTURAL SCIENCES



# 2008 ISP GUIDELINES

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## Making the most of your ISP: an introduction for scholars

The Independent Study Project is a central part of each scholar's PGSAS experience. As part of the ISP, you will have the opportunity to work directly with members of Penn State's impressive community of academics and policy-makers in agriculture. You will learn firsthand how agricultural research works and will be given the opportunity to make an independent contribution to this field.

The ISP also provides a great opportunity for professional development. Scholars from previous classes have found the ISP experience helpful as a source of recommendations and essay material for college applications, and, in many cases, as a stepping-stone to further internships and employment in the many fields of agriculture.

Because ISPs are conducted independently, you will be responsible for designing your own schedule and monitoring your own progress throughout the five-week project. Although the Academic Projects Coordinator, the RLCs, and the GSAs will be on hand to provide support and guidance throughout the experience; the success of any given ISP is largely in the hands of the individual scholar researcher. Scholars who attack their research eagerly and who interact responsibly and professionally with their faculty mentors have found the ISP to be a tremendously rewarding experience. So get ready to start researching, work hard and have fun!

## Whose job is this?: Responsibilities of 2008 PGSAS ISP Participants



### **Academic Projects Coordinator (APC) – Ms. Valerie Reinoso**

1. Plan and facilitate the ISP classes.
2. Assist all participants in making the ISP projects run smoothly.
3. Keep on file samples of previous abstract journals to share with scholars.
4. Schedule ISP transportation as requested by scholars and mentors.
5. Monitor the progress of ISP projects.
6. Be available to meet with scholars and mentors as needed.
7. Provide thoughtful evaluation on presentations and abstracts.
8. Accept phone messages and e-mail at the following numbers/address:

**Office: (814) 441-0105**

**E-mail: [vpr104@psu.edu](mailto:vpr104@psu.edu)**

### **Scholars**

1. Attend all classes and workshops.
2. Work with your mentor to schedule convenient meeting times.
3. Report all transportation needs to the APC **at least 24 hours in advance**.
4. Report your weekly progress to your GSA and the APC.
5. Maintain and complete your Electronic Portfolio and (optional) Reflective Journal.
6. Complete requirements of research project as assigned by your mentor.
7. Complete all assignments by their respective due dates.

### **Mentor**

1. Assist scholars in developing a meaningful ISP project following either an experiential or experimental format.
2. Help scholars in arranging convenient meeting times.
3. Contact the APC with any concerns, questions, suggestions, or comments throughout the five weeks.
4. Review and approve scholars' abstracts **prior** to the due date of **Tuesday, July 29<sup>th</sup>**.
5. Review and approve scholars' presentations **prior** to the run through on **Thursday, July 31<sup>st</sup>**.

### **Governor's School Assistants (GSAs)**

1. Take attendance and make any needed announcements before classes.
2. Assist scholars with assignments (e.g., read rough drafts of abstract/presentation as needed, etc.).
3. Help in purchasing needed materials for completion of ISP projects and presentations.
4. Check progress of assigned scholars on a weekly basis and bring concerns to the coordinator.

### **Residence Life Coordinators (RLCs)**

1. Transport scholars to ISP work sites as directed by the APC.
2. Assist scholars with assignments (e.g., read rough drafts of abstract/presentation as needed, etc.).
3. Help in purchasing needed materials for completion of ISP projects and presentations.
4. Address scholars' questions and bring concerns to the attention of the APC.

## The ISP: an Overview

ISP stands for **I**ndependent **S**tudy **P**roject. There are four parts to the ISP:

1. **Research** conducted with a faculty mentor
2. **Sessions/workshops**
3. A written **abstract** for publication
4. A formal **presentation** of the project

Projects can generally be classified as either Experimental or Experiential.

### The Experimental ISP

An **experimental** project is one in which you formulate a hypothesis and test it. Experimental projects may be conducted in a lab or in the field. The key is that they are done in a controlled environment where the effects of changing one or more conditions can be determined. An experimental project should be conducted in roughly the following stages:

1. Discussion with mentor concerning project.
2. Literature review of related material.
3. Formation of a hypothesis.
4. Design of the procedures of the experiment.
5. Collection of data.
6. Interpretation of results and drawing conclusions.
7. Preparation of abstract/presentation.



## The Experiential ISP

An **experiential** project is one in which you learn about an area without specifying a hypothesis or research question. Though experiential projects can take many different forms, they are commonly in-depth studies of a particular topic. Some experiential projects involve researching a topic (i.e. indoor air pollutants) and writing a report similar to a term paper. Other experiential projects involve gathering information and putting it together in the form of educational materials. In a past year, for instance, scholars developed a guidebook and informational signs to be placed along a trail in Penn State's experimental forest. Because of the diversity of experiential projects, the format for experiential results may differ depending on the project. An experiential project should be conducted as follows:

1. Discussion with mentor concerning project.
2. Literature review of related material.
3. Development of plan for your experience (What will you do to learn about this topic?).
4. Recording of detailed notes during experience.
5. Discussion with mentor as to what occurred and what you learned.
6. Preparation of abstract/presentation.



## Getting off on the right foot

One of the most exceptional parts of the PGSAS ISP experience is the opportunity to build a unique working relationship with a faculty mentor in the agricultural sciences. To make sure your experience gets off to a good start, you'll want to spend a little time preparing before you meet your mentor for the first time. Some tips for making sure the meeting goes well:

- Before the ISP starts, **spend some time gathering information about your mentor and his/her research group**. The internet is a good place to start, since many professors have websites. Go to the college website at [www.cas.psu.edu](http://www.cas.psu.edu), find the department your mentor is in, go to personnel, and read what comes up. Or, go to [www.psu.edu/ph](http://www.psu.edu/ph) and type in your mentor's name to see if he/she has a personal website. **And, if your mentor has suggested reading material for you, read it!**
- As you're reading, **try to compile a list of possible questions** you'd like to ask your mentor about the details of his/her research. The focus of the first meeting should be learning about your mentor and the ISP experience ahead. Questions are a great way to show that you're excited about the project and interested in learning more. If a professor says something that's unclear to you, don't be afraid to ask him/her to explain further!
- Take time before the first meeting to make sure you know where your mentor's office is located, and **arrive at least five minutes early**. Wear the same sort of sensible clothing that you might wear for a lab in high school, including no open-toed shoes. Bring a notepad and pen to write down any important information, and bring your schedule to plan future meetings during your open ISP Work Time.
- Address your mentor as "Professor X" or "Dr. X," unless (s)he specifies a different name. Be sure to thank her/him for agreeing to supervise your ISP!
- Lastly, **be friendly and enthusiastic** – professors put a good deal of time and effort into their mentoring, and they'll want to know that you're motivated to complete the best project possible.

## Writing the Abstract

Your abstract should give a brief (~150 words) summary of the aims and results of your research. It should be sufficiently clear and complete to allow the casual reader to understand quickly what your project is about. All Governor's School abstracts will be published in a journal, which you and many others associated with the program will receive-- it's a great way to showcase your hard work!

You'll want to follow standard rules for writing clear, scientific prose when writing your abstract and preparing your presentation. We'll be spending more time in ISP class discussing the basics of good scientific writing, but for now, some initial tips on producing a professional-sounding and highly readable abstract:

1. **Use the objective passive voice** as much as possible (i.e. "The sample *was incubated* at 37° C for 24 hours," not "I incubated the sample at 37° C for 24 hours").
2. **Be concise:** avoid unnecessary wordiness and long-winded description.
3. Most importantly, **give yourself plenty of time to do a good job**. Write rough drafts as you go instead of doing it all at the end. And have someone else (a fellow scholar, RLC, GSA, or Valerie) proofread your abstract and presentation a week or so before the due date (Tues., July 29<sup>th</sup> for the abstract). *The more critiques you get, the better!*

A general format and sample abstracts for both experiential and experimental abstracts are given on the following two pages.

## General Abstract Format

### Format for Abstracts (Experiential or Experimental)

Title

Your Name

Your High School

Mentors' Names and Professional Titles

(i.e. Associate Professor, Department of Entomology; Graduate Assistant)

The abstract goes here. Usually one or two paragraphs are sufficient to describe a project. Include introductory information, procedures, data, results, conclusions, etc.

Please list your mentor's name and the names of any graduate students who mentored or assisted you with your project above. Check with them about the order they should be listed in. *Be sure to include your mentor and assistants' full titles, including Dr., Ms., Mr., etc.*

Submit as a MS Word Document attachment with NO formatting or bolding.



## Sample Abstracts

### EXPERIMENTAL REPORT

A Comparative Analysis: Effects of Water Quality on the Types and Abundance of Aquatic Insect Fauna  
David Smith  
ABC Area High School  
Dr. Edward Rojotte, Assistant Professor, Department of Entomology  
Ms. Mary Roberts, Graduate Assistant, Department of Entomology

A change in the aquatic ecosystem can be the first indicator of water pollution. The presence of certain species, known to be tolerant to various forms of aquatic pollutants, along with the absence of known pollution - sensitive organisms can reveal the source or absence of, or contamination by pollutants. This project was designed to study the effects of water quality on the types and species diversity of aquatic insect fauna.

Because of time, the whole spectrum of water quality tests were not performed, but rather a rough analysis instead. All samples were taken by hand using d-ring and seine nets and preserved in alcohol. The results found that the orders of *Trichoptera*, *Ephemeroptera* and *Plecoptera* were most abundant in cleaner, well-aerated streams, while orders of *Odonata*, *Diptera*, and *Coleoptera* were better represented in slower areas with higher turbidity.

### EXPERIMENTAL REPORT

Scanning Electron Microscopy of Maize Starch Granules  
Richard Kim  
XYZ Area High School  
Dr. Donald Thompson, Assistant Professor, Department of Food Science  
Ms. Rosemary Walsh, Director, Electron Microscope Laboratory  
Ms. Joanne Stryker, Research Technologist

Scanning electron microscopy (SEM) can be used to magnify particles too small to be seen with a standard light microscope. Images can be photographed for collection of data on dimensions and shape.

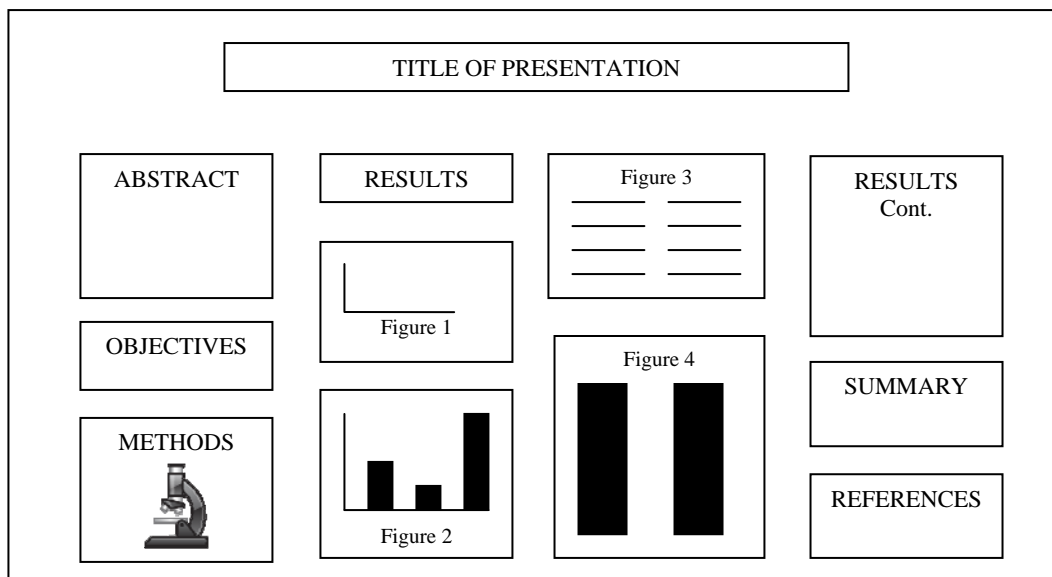
In this project, several genetic strains of maize starch granules were viewed using SEM techniques. A photo adapter took black and white negatives of the images, which were translated by digitizing computer into usable data on dimensions and shape. The data, reflecting differences between the various strains, will be used in future research on the effects of size and shape on the physical properties of maize starch.

## Presentation Guidelines

At the end of Governor's School, you will educate other scholars and mentors about your research using either a poster or an oral presentation. You can choose whichever of the two you prefer, but we can have no more than 32 oral and 32 poster presentations total. Your mentor will give you specific guidelines for your particular project presentation, but here are some general rules:

**Oral presentations** are **6 minutes long, plus 2 minutes** for questions. Visual aids are strongly recommended. PowerPoint is typically used. Include in your presentation your project title, your name, the question/subject that you investigated, the procedures/methods you used, and your results. You can insert pictures, tables, and graphs into your slide show to enhance the presentation.

**Poster presentations** involve creating a research poster display like the one shown below (note: this is just an example; *do not duplicate it exactly* in your own presentation!) Although you do not have to prepare a formal oral presentation when you create a poster display, you need to prepare a **2-minute speech** about your project. You also must be able to answer any questions about your research during the symposium, and describe aspects of your project to evaluators and other scholars.



## Section Guidelines: Experimental Research

The abstract and presentation for an experimental ISP should include the following in condensed form:

### A. **Introduction**

1. Gives a brief overview of the existing state of the field. What's already known about the question you're addressing?
2. Summarizes the broader problem you're addressing.
3. States the hypothesis or research question.

### B. **Methods and Materials** (or Procedures)

1. Gives a concise narrative description of the methods used to obtain your results, including instruments, techniques, and statistical tests.

### C. **Results**

1. States the findings of your experiments, using charts/graphs if appropriate.
2. Presents data simply and objectively, **without interpretation**.

### D. **Discussion**

1. Interprets results as related to hypothesis.
2. Relates results to past experiments.

### E. **Conclusions**

1. Discusses implications of findings for our current understanding of the field.
2. Describes possible directions for further research.

### F. **Acknowledgments** (Suggested)

1. Notes the contributions of your mentors, assistants, GSAs, etc.

### G. **Literature Cited/References**

1. Lists the published sources you've cited throughout your presentation. (Check with your mentor on the reference style that should be used.)



## Section Guidelines: Experiential Research

The abstract and presentation for an experiential ISP should include the following in condensed form:

### A. Introduction

1. Give relevant background information for your investigation; answers the questions: what's the situation? Why is this project important?
2. States the broader question/issue that your project aims to address.

### B. Methods and Materials

1. Describes any methods used, i.e. equipment or organisms studied.
2. (*If project is a research report:*) Lists criteria for including information sources (articles, books, etc).

### C. Results

1. Summarizes findings/results of your project.
2. States outcomes *without interpretation*.

### D. Discussion

1. Discusses results and relates them to the initial problem statement.
2. If appropriate, critiques methods used and describes how they could have been improved.

### E. Conclusions

1. Discusses broader meaning of what you have learned.
2. Suggests future directions for research or experiential projects.

### E. Acknowledgments (Suggested)

1. Notes the contributions of your mentors, GSAs, etc.

### F. Literature Cited/References

1. Lists the published sources you've cited throughout your presentation. (Check with your mentor on the reference style that should be used.)



## Working with Tables and Figures

Depending on the nature of your project, you may find it useful to include tables (ordered matrices of data) or figures (graphs, charts, photographs and other pictorial illustrations) in your presentation to help readers understand your findings. The following are some general guidelines to follow in creating and formatting tables and figures.

1. **Use figures sparingly.** If you have multiple photographs of the same thing, for instance, you may wish to present only one representative example. Avoid confusing the reader by cramming your presentation full of redundant graphics.
2. With that said, **aim to be as complete as possible in the presentation of your data.** Never “tidy” a table or graph by omitting outlying data points; data that *doesn't* fit into a smooth curve or trend is often the most interesting from a scientific standpoint. Make sure the figures you use give the audience a thorough and accurate idea of your findings.
3. **Keep it simple and professional looking.** Although color and dividing lines can help direct the reader's attention to important data, garish and overly busy figures are confusing and distracting in a scientific poster or presentation.
4. **Make sure each figure/table is given a sequential number and clear, descriptive title** (ex: “**Table 1.** Muscle glycogen values in relation to feed withdrawal time”). Any non-text inclusion must be classified as *either* a “Table” or a “Figure” (everything not a table), so you shouldn't be labeling anything “Chart 1” or “Photo 1,” etc. Tables and figures are numbered separately, so you can have a Table 3 *and* a Figure 3, etc.

## Citation Guidelines

Why are citations necessary? All good research builds on other scholars' work. Citations make it clear where your ideas end and other people's start. Citing your sources lends credibility to your work, and directs the reader to more detailed information on the topic.

You should **always** document:

- quotations, opinions, and predictions whether or not they are quoted or paraphrased
- statistics derived by original author
- visuals from original author
- case studies
- another author's direct experimental methods or results
- another author's unique research procedures or findings

Use the original sources. **Don't cite an article as it is cited in another journal** - get the original article yourself, review it and determine how you'll use the information. You may use any of several different citation formats, depending on your mentor's preferences. Above all, **make sure to keep your citations consistent and complete!**



## 2008 ISP Assignment Timeline

**Note:** Send all documents as an attachment. Be sure to save the file as LastnameFirst\_AssignmentType.doc

**DO NOT** send files without your name (“Abstract.doc”) They will be lost!

Tues., July 1<sup>st</sup> or Wed., July 2<sup>nd</sup>: Fill out Questionnaire with mentor.

Wed., July 2<sup>nd</sup> or Thurs., July 3<sup>rd</sup>: Submit Mentor Questionnaire online through ANGEL survey in time for meeting with Valerie.

Sat., July 5<sup>th</sup>: Meet with Valerie to discuss first meeting with mentor or any concerns.

Tues., July 22<sup>nd</sup>: Submit a **ROUGH DRAFT** of your abstract on ANGEL and e-mail a copy to your mentor to review.

Prior to Tues., July 29<sup>th</sup>: Have your mentor review and approve your abstract and poster/oral presentation.

Tues., July 29<sup>th</sup>: Submit the **FINAL** Abstract and Presentation to your mentor for their assessment and submit a copy on ANGEL.

Tues., July 31<sup>st</sup>: Printed version of poster due in 118 ASI by 5 pm. Oral presentations must be brought to practice session in 101 ASI.

Fri., August 1<sup>st</sup>: **ISP Research Symposium**: Oral or poster presentation of your ISP project. *Oral reports*: are limited to 6 minutes followed by a 2 minute question and answer period; visual aids are required. *Poster displays*: should appear professional and detailed. Scholars are required to answer questions of evaluators during poster segment of symposium.

*\*Should there be any glitches on ANGEL, e-mail your assignment directly to Valerie ([vpr104@psu.edu](mailto:vpr104@psu.edu))\**

## 2008 PGSAS ISP Abstract and Presentation Assessment

Scholar Name: \_\_\_\_\_

Project Title: \_\_\_\_\_

Critical Assessment	Connections	Evidence	Voice	Conventions
<p><u>Scholar's Level of Understanding and Focus:</u></p> <ul style="list-style-type: none"> <li>• A depth of understanding and critical thinking is demonstrated.</li> <li>• The contribution of previous research is understood.</li> <li>• It is objectively written with a minimum of emotional influence.</li> <li>• Their position is established with clear objectives.</li> </ul>	<p><u>The Whole is Greater Than the Sum of the Parts:</u></p> <ul style="list-style-type: none"> <li>• Information is presented in logical sequence; correct use of report sections is demonstrated (intro, lit. review, methods, etc.).</li> <li>• All parts of the abstract and presentation support the whole.</li> <li>• The study problem and results are related to both scientific and human importance.</li> </ul>	<p><u>Information Presented is Credible and Convincing:</u></p> <ul style="list-style-type: none"> <li>• Scholar's role in the research is apparent</li> <li>• Ideas are supported by accurate and relative evidence.</li> <li>• Strengths and weaknesses of evidence are discussed where appropriate.</li> <li>• Discrepancies between current and previous research are explained.</li> <li>• Sources are cited appropriately.</li> </ul>	<p><u>Reported in Scientific Writing Style:</u></p> <ul style="list-style-type: none"> <li>• Concepts are well explained and understandable to the reader.</li> <li>• Tone is proper and consistent.</li> <li>• Correct verb tense</li> <li>• Nomenclature is correctly used.</li> <li>• Appropriate amount of detail is included (i.e. lab recipes, site descriptions).</li> </ul>	<p><u>Syntax and Details:</u></p> <ul style="list-style-type: none"> <li>• Grammar and Punctuation.</li> <li>• Correct format for references, etc.</li> <li>• Varied sentence structure.</li> <li>• Appropriate vocabulary and word usage.</li> <li>• Tables, figures, graphs, if included, are:                             <ul style="list-style-type: none"> <li>- easy to read</li> <li>- can stand alone</li> <li>- referenced in the text</li> </ul> </li> </ul>
<i>Check appropriate level for each category:</i>				
Exceeds	Exceeds	Exceeds	Exceeds	Exceeds
Meets	Meets	Meets	Meets	Meets
Approaches	Approaches	Approaches	Approaches	Approaches
Needs More	Needs More	Needs More	Needs More	Needs More

Comments and Suggestions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Mentor's Name: \_\_\_\_\_

Mentor's Signature: \_\_\_\_\_

Date \_\_\_\_\_

# PGSAS ISP Poster Evaluation

SCHOLAR'S NAME: \_\_\_\_\_

PROJECT TITLE: \_\_\_\_\_

EVALUATOR: \_\_\_\_\_

### **Problem and Hypotheses**

Extent of student's involvement is clear.

Originality shown

Builds on research of others (citations included)

\_\_\_\_\_

### **Background Information**

Depth of understanding of previous work shown

Resources and assistance acknowledged

Relevant references made to literature

\_\_\_\_\_

### **Design of Investigation**

Extent of student involvement evident

Problem, research questions, and hypotheses consistent

\_\_\_\_\_

### **Investigative Procedures (as appropriate)**

Evident that student did observations, measurements,  
information search, data collection

Procedures clearly described

Laboratory/field techniques clearly described

Variables properly identified

\_\_\_\_\_

### **Analysis and Interpretation (as appropriate)**

Process of data described and appropriate

Data, tables/graphs clearly presented, easy to read

Data are interpreted for reader

Information obtained from a variety of sources

Appropriate conclusions drawn

\_\_\_\_\_

### **Significance, Applications, Further Research**

Results related to other studies

Implication for scientific and/or human importance made

Appropriate future research suggested

\_\_\_\_\_

### **Presentation**

Clearly presented: problem, hypotheses, background, design  
and procedures, analysis, and applications.

Uses tables, graphs, charts, photos, drawings, etc. advantageously

Responses to questions appropriate

Style and size of printed material easy to read

Poster is neat and organized

Project summary well developed and clear

\_\_\_\_\_

<b>KEY: 1=Excellent 2=Very Good 3=Good 4=Good But Needs Work 5=Needs Improvement</b>
--

**PGSAS**  
**ISP Oral Presentation Evaluation**

SCHOLAR'S NAME: \_\_\_\_\_  
PRESENTATION TITLE: \_\_\_\_\_  
EVALUATOR: \_\_\_\_\_

**Problem and Hypotheses**

Extent of student's involvement is clear.  
Originality shown  
Explanation of research of others clear

\_\_\_\_\_

**Background Information**

Depth of understanding of previous work shown  
Resources and assistance acknowledged  
Clear explanation of concepts/problem

\_\_\_\_\_

**Design of Investigation**

Extent of student involvement evident  
Problem, research questions, and hypotheses consistent

\_\_\_\_\_

**Investigative Procedures**

Evident that student did observations, measurements,  
information search, data collection  
Procedures clearly described  
Variables properly identified

\_\_\_\_\_

**Analysis and Interpretation**

Process of data described and appropriate  
Data, tables/graphs are clearly presented, easily understood  
Data are interpreted for listener in an appropriate fashion  
Appropriate conclusions drawn and presented

\_\_\_\_\_

**Significance, Applications, Further Research**

Results related to other studies  
Implication for scientific and/or human importance explained  
Appropriate future research suggested

\_\_\_\_\_

**Presentation**


Clearly presented: Amount/detail of introduction and findings,  
Speed of speaking, volume of voice, use of gestures and  
enunciation were appropriate  
"Crutches" used effectively  
Use time efficiently

\_\_\_\_\_

<b>KEY 1 = Excellent 2 = Very Good 3 = Good 4 = Good But Needs Work 5 = Needs Improvement</b>
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## JULY – AUGUST

Sun	Mon	Tues	Wed	Thu	Fri	Sat
<b>JULY</b>  		1	2	3	4	5
			<b>Section 3,4 Submit Mentor Questionnaire</b>	<b>Section 1,2 Submit Mentor Questionnaire</b>		<b>10 minute meeting with Valerie</b>
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
		<b>Rough Draft of Abstract Due</b>				
27	28	29	30	31	<b>AUGUST 1</b>	2
		<b>Final Abstract and Presentation due to Mentor &amp; Valerie</b>		<b>PowerPoint due time of practice Posters due in ASI by 5 PM  Symposium Practice Mandatory!</b>	<b>Portfolio CDs due by 8 AM  <i>Research Symposium</i></b>  