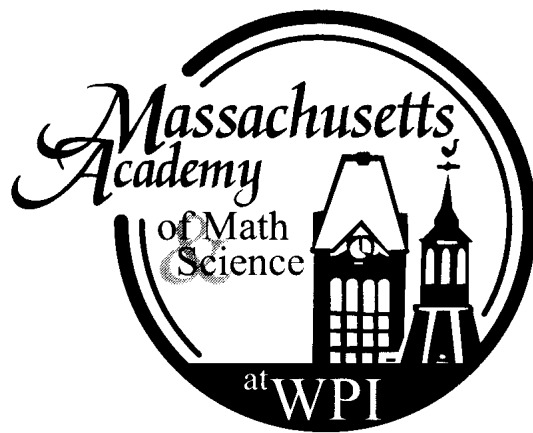


*MASSACHUSETTS ACADEMY
OF
MATHEMATICS AND
SCIENCE*



*SENIOR INDEPENDENT
STUDY PROJECT
2009 - 2010*

Senior Independent Study Project Description

The Senior Independent Study Project (SISP) provides an opportunity to acquire knowledge that is *new to the student* outside of the traditional classroom-based curriculum. The SISP also provides an occasion for students to improve their life-long learning skills. Overall, the SISP provides Academy students further opportunity to practice critical thinking and problem solving in an independent learning situation.

With the SISP, the student may investigate any area of special interest with the approval of and under the supervision of an Academy advisor and with the assistance of a qualified mentor. Successful projects in the past include art, dance, music and writing projects, physical training, new language acquisition, theatre directing, EMT training, aviation training, initiation of new or continuation of past research, in-depth study of a religious event or observance, computer animation.

As a guide, students should plan to spend the equivalent of a one-term course at WPI on the activities of the project: practicing, reading, training, rehearsing, building, and testing. Additional time will be needed to complete the binder/journal (documentation, description, analysis) and presentation of what is learned and how it was learned. Each student will present the results of his/her learning to the Academy community during April of the senior year. The SISP is a required, graded course at the Academy. It is recorded on the transcript.

There are several checkpoints and products designed to aid the student in developing, undertaking, and evaluating the SISP.

1. By Monday, 24 August 2009, the student must submit a one-page, printed narrative proposal to the faculty Advisor (see below for proposal guidelines). The advisor will review the proposal, discuss it with other faculty during a staff meeting, ask for revisions if necessary, and, upon receipt of acceptable modifications, approve the project.
2. By Monday, 28 September 2009, the student must submit a timeline for the SISP to the Advisor. This will be used to determine the feasibility of completing the project.
3. Toward the end of A-term, 15 October, the student must meet with the Advisor for the first of four required meetings.
4. By Monday, 02 November 2009, the student must submit an Assistance Agreement Form. The form will show that the student has secured the help of one or more qualified mentors.
5. Toward the end of B-term, 17 December 2009, the student must meet with the Advisor for the second of four required meetings.
6. On Monday, 25 January 2010, the student must submit the Mid-Project Reflection paper.
7. Toward the end of C-term, 05 March 2010, the student must meet with his/her advisor for the third of four required meetings.
8. By Monday, 29 March 2010, the student must submit the Summary paper and the student must meet with his/her advisor before the presentation of the project for the fourth of four required meetings.
9. On Thursday, 22 April 2010, the student will present the results of their projects.
10. On Monday, 26 April 2010, the student will submit the Final Reflection Paper and documentation binder.

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Deadlines

Proposal	Monday, 24 August 2009
Timeline	Monday, 28 September 2009
Assistance Agreement Form	Monday, 02 November 2009
Mid-Project Reflection	Monday, 25 January 2010
Summary Paper	Monday, 29 March 2010
Presentation	Thursday, 22 April 2010
Final Reflection and Binder	Monday, 26 April 2010
Four Meetings with Academy Advisor	One each term

Requirements for successful completion of the SISP

This notebook containing:

- An approved Project Proposal
- A Timeline for the work to be accomplished throughout the year
- A Journal with weekly entries
- A signed Assistance Agreement Form
- A Mid-project Reflection Paper
- A Summary Paper
- A Project Presentation/ Exhibition
- A Final Reflection Paper
- A record of the four meetings with your Academy advisor

All submitted documents are to be word-processed (with the exception of your Journal entries). Two copies of each document should be made. One is to be submitted to your advisor on the date it is due, and the other placed in your SISP binder, since these documents must be in your binder when you submit it in April.

Project Proposal Guidelines

Due: Monday, 24 August 2009

A Senior Project Proposal addresses the following questions:

Focus. What is your special interest?

Intent. What is the new knowledge, attitude, and/or skills that you expect to gain from the project? Why will these make it an interesting and worthwhile project for you to undertake?

Prior Knowledge. What knowledge, habit of mind, skill, and need do you bring to this project?

Methods of Inquiry. How will you investigate your special interest and make good on your intent? Who will you ask to help you, either through advice, observation or apprenticeship? What specific resources will be needed? What challenges do you expect?

Evidence of Learning. What will be your evidence of success or change?

Sample Project Proposal

Due: Monday, 24 August 2009

For my senior project, I would like to research the history of American quilting and make a queen-sized sampler quilt. A sampler quilt is composed of a wide variety of quilt patterns. Quilting and samplers in particular have always intrigued me because of my mother. She has been working on a sampler for years, quilting half of a square at a time when she can. It is a lovely mix of techniques, quilting styles, patterns, and colors. Such a quilt is an heirloom, and I want one of my own for my hope chest.

I feel this will be a stretch for me because it is more of a hands-on project than what I typically choose to do. In addition, a queen-sized sampler quilt is a much larger and more complicated project than I've ever considered. I rush whenever I have to sew by hand, creating large, uneven stitches, so hand-quilting will also be a lesson in patience for me. Some of the difficulties I anticipate are getting my intersecting seams to line up properly, calculating the fabric yardage I need and being able to find the perfect set of colors. I also risk not completing the quilt on time. My goal is to machine-piece the top and hand-quilt it by April, 2004.

I plan to use numerous techniques to machine-piece and hand-quilt my final product. The quilt will measure 100" x 115" with a five-inch border and three-inch sashing between each of the 42 quilt blocks. Following tradition, I plan to make my own binding.

To learn color theory, I will work through a well-known resource workbook called *Color and Cloth* by Mary Coyne Penders. The book is designed to aid quilters in choosing colors based on hue, value, intensity, temperature and scale, and to choose cloth with appropriate visual texture and lay-out of patterns. (I hope to gain a better understanding of art terminology as well.) I would like to understand the theories behind color before I choose fabric. I also plan to visit the quilt museum in Lowell.

Creating a sampler quilt will ensure that I use the widest variety of piecing techniques possible. Therefore, I intend to choose the patterns for my blocks following a list of basic patterns suggested by my mentor. These will incorporate such piecing techniques as strip-piecing to make triangles, inward and outward curved seams, diamonds and rectangles and other non-square shapes, non-right triangles, and appliqué and reverse appliqué.

I would like to observe and attempt different quilters' hand-sewing techniques, as they hopefully assist me in quilting my pieced top. I plan to do at least 60-70% of the quilting myself, but Mrs. Flagg says 42 is a lot of blocks. The hand-quilting techniques I hope to learn are background patterns, echo quilting, outlining parts of the pattern, motifs in large squares and cables or chains in long patches.

In addition to *Color and Cloth*, some of the resources that I will use include quilting magazines such as *Quilter's Newsletter Magazine*, *American Quilter*, and *Lady's Circle Patchwork Quilt*, and books like *Quilting School* by Ann Poe, *Encyclopedia of Classic Quilt Patterns* published by Leisure Arts, and *Color for Quilters* by Susan Richardson McKelvy. Mrs. Susan Flagg, a very experienced quilter, is willing to mentor me.

Thank you for considering my proposal to make a queen-sized sampler quilt in a year.

Sample Timeline

Due: Monday, 28 September 2009

There are many methods of creating a timeline. The following sample is here only as a guideline to assist you in developing a timeline for your Project.

Key Activity	Start-End
Discuss the National Conversation extensively with a broad range of constituents to refine the concept and develop the specifics and structure of the Conversation	Completed
Identify existing documents from organizations, specific campuses, or systems that identify key knowledge and skills for university success	Completed
Develop resource packets to support regional meetings	Completed
Identify facilitators for regions and content areas	Completed
Identify consultants to review results of regional meetings	Completed
Train facilitators to organize and conduct regional meetings	1/01-11/01
Conduct regional meetings	1/01-11/01
Analyze and summarize results from regional meetings	2/01-8/01
Collect student work examples	12/00-12/01
Convene consultants to review results of Conversation and examples of student work	7/01
Develop draft of Key Knowledge and Skills for comment; distribute to list of interested parties; circulate exemplars for reactions	8/01-9/01
Revise based on comments	10/01
Print draft version of Key Knowledge and Skills with exemplars	11/01
Print final version of Key Knowledge and Skills with exemplars in brochure format	2/02
Mail brochure and post to website in PDF for downloading	3/02
Collect information from AAU institutions for inclusion in CD-ROM	Ongoing
Create CD-ROM master	4/02-6/02
Distribute draft CD-ROM for reactions and corrections	8/02-9/02
Distribute CD-ROM to all U.S. high schools	9/02

Assistance/Mentor Procedure

One of the requirements of your Senior Independent Study Project is to obtain assistance from a qualified person in your area of interest. This assistance may be in the form of a mentor, a teacher, an interview, or some other form of personal interaction in your quest for new knowledge. The following pages are for your use when you make the initial contact. When you go for assistance (ask for a person to mentor you, etc.) take 1) the Letter of Introduction, 2) your Project Proposal, and 3) a copy of the Agreement Form with you. Ask the person to read the Letter and your Proposal and then sign a copy of the Agreement Form, should they agree to assist you. You will need to follow this procedure for each person who assists you in a significant way, so make several copies of the Agreement Form. It is your responsibility to keep the signed Agreement Forms in your binder.

Letter of Introduction



Senior Independent Study Project

Dear Sir or Madam:

The bearer of this letter is a student at the Massachusetts Academy of Mathematics and Science at WPI and is showing the letter to you because you may be able to help. Let me say a little about the project and how you may be of assistance.

The purpose of the project is to provide opportunities for Academy students to learn from experiences that usually do not take place in the traditional school curriculum, though they may have their source in a school subject or skill. To do this, students choose topics or activities that greatly interest them, develop an individual education plan with help from an Academy teacher, and then carry out the plan. As part of the learning, students must seek advice and help from individuals who are knowledgeable and experienced in the chosen area of interest. The final result, whether written or performed, demonstrates what new knowledge the students have gained and how it was acquired. Regardless of content, it is expected that the students' ability to think intelligently and understand the world more fully, as well as to develop some strategies to enhance life-long learning, will improve as a result of the project. The Project is required for graduation.

In the past, projects have ranged from artistic creations to work-internships, EMT training, preparation for the Boston marathon, computer animation, acquiring a new language, and overseas study. Expert advisers like you have made key contributions by providing advice, giving contacts, making available space in labs, studios, or workshops, demonstrating techniques and skills, and commenting on written summaries or performances. Many advisers have noted that they have gained from as well as given to these independent studies. To help you assess whether you can help, a copy of the student's proposal is attached. If you would like further information about the project or the Academy in general, please do not hesitate to call me at 508-831-5859.

On behalf of our students, I appreciate your attention to this invitation and hope that you may be able to help. Thank you very much.

Sincerely,

Rob Traver, Ed.D.
Principal

Agreement Form

Due: Monday, 02 November 2009



I have read the Letter of Introduction and the Project Proposal and I agree to assist

_____ in his/her quest for new knowledge.

student's name

_____ signature

_____ printed name

_____ phone number/email

_____ date

Mid-Project Reflection Expectations

Due: Monday, 25 January 2010

The Mid-Term Reflection is an opportunity for you to reflect upon the work you have accomplished so far on your SISP. It should be a two-page paper to include (but not limited to):

- A description of the process of creative thinking and discovery (described below) you have experienced so far
- A report on the progress you have made toward meeting your goals
- A self-assessment of your work to date.

The process of creative thinking and discovery is generally accepted that truly creative thinking and discovery in regard to any topic is based upon moving through the following steps that lead to the creation of new knowledge:

Knowledge – recount what specific knowledge you have gained through the process of your project

Comprehension – explain your understanding of the knowledge you have acquired

Application – how you will use this knowledge in a new way or apply it to a different situation

Analysis – examine each of the elements that make up your knowledge in relationship to the whole project

Synthesis – create a new idea or product based on your understanding of the knowledge you have acquired

Genuine new knowledge requires an on-going process of revision and reevaluation. You must continually go back to previous steps to incorporate new information and results. This process is a loop which cycles back on itself and requires you to use each step a number of times, not necessarily in any particular order, to come to your final conclusions.

Because this is a written presentation, the following standards for written excellence are required. Distinguished writing must:

- Establish and maintain a clear purpose and focus
- Be organized from beginning to end
- Demonstrate a logical progression of ideas, and be coherent
- Supply pertinent, explicit details, and provide ideas/information in depth
- Consider audience and purpose
- Have few or no errors present
- Show clear evidence that the directions in the SISP packet were followed

Mid-Project Reflection Scoring Rubric

Scoring Key

3	<i>Exceeds expectations</i>
2	<i>Meets expectations</i>
1	<i>Fails to meet expectations</i>
0	<i>Not Done</i>

CONTENT

Process _____

- Includes a description of the ongoing process of revision and reevaluation

Reflection _____

- Shows evidence of thoughtful self-assessment

Progress _____

- Demonstrates progress toward new knowledge

WRITTEN PRESENTATION

Organization _____

- Includes a well-developed introduction, body, and conclusion
- Demonstrates proper paragraphing and effective transitions
- Contains a logical progression of ideas

Usage/Style _____

- Establishes an appropriate tone/ shows awareness of audience
- Shows clear evidence of proofreading/ proper format is used
- No more than two or three minor errors in grammar and usage

Summary Paper Expectations

Due: Monday, 29 March 2010

Your Summary Paper should demonstrate “new knowledge”, **what** you have learned through your investigation and **how** you went about acquiring this knowledge. It is a written summary of the facts, skills, and understanding you have gained while working on your project. Address the following categories, based on Bloom’s Taxonomy of learning, as you recount your own experience of learning throughout this project:

Knowledge – recount what specific knowledge you have gained through the process of your project

Comprehension – explain your understanding of the knowledge you have acquired

Application – how you will use this knowledge in a new way or apply it to a different situation

Analysis – examine each of the elements that make up your knowledge in relationship to the whole project

Synthesis – create a new idea or product based on your understanding of the knowledge you have acquired

***Evaluation* – judge the value of your new information, skill, idea or product**

Summary Paper Scoring Rubric

Scoring Key

3	<i>Exceeds expectations</i>
2	<i>Meets expectations</i>
1	<i>Fails to meet expectations</i>
0	<i>Not Done</i>

CONTENT

Abstract _____

- Includes a clear and concise description of the Project

Process _____

- Includes a description of the cycle of revision and reevaluation

New Knowledge _____

- Demonstrates new knowledge as a result of the SISP

WRITTEN PRESENTATION

Organization _____

- Includes a well-developed introduction, body, and conclusion
- Demonstrates proper paragraphing and effective transitions
- Contains a logical progression of ideas

Usage/Style _____

- Establishes an appropriate tone/ shows awareness of audience
- Shows clear evidence of proofreading/ proper format is used
- No more than two or three minor errors in grammar and usage

Presentation Expectations

Presentation Date: Thursday, 22 April 2010

The SISP presentation is your opportunity to exhibit your new knowledge in a professional manner. You will have fifteen minutes to present and five minutes for questions and answers.

Presentation Preparation Checklist

- Check presentation time
- Rehearse (meet time constraints)
- Visual aids
- Professional attire
- Test technology

Presentation Scoring Rubric

Scoring Key

3	<i>Exceeds expectations</i>
2	<i>Meets expectations</i>
1	<i>Fails to meet expectations</i>
0	<i>Not Done</i>

Mechanics of Presentation

_____ The speaker utilized effective mechanics of presentation through vocal variety, emphasis of key points, clarity of speech, humor, eye contact, pace, and rhythm.

Knowledge of Content

_____ The speaker demonstrated mastery of content of his/her material/subject.

_____ The speaker answered questions from the audience in an informed and confident manner.

Support Materials

_____ The speaker's appropriate use of supporting materials enhance the project/presentation and are effectively referenced and utilized.

_____ The speaker's supporting materials meet high standards of excellence (craftsmanship, design, and creativity).

Time Management

_____ The speaker utilized his/her time effectively.

Professionalism

_____ The speaker displayed an appropriate tone and professional style of dress.

Final Reflection Paper Expectations

Due: Monday, 26 April 2010

This paper examines the entire process of your project, including the presentation. In writing your reflection, keep in mind the following guideposts for this journey of introspection:

- How have you sought clarity and accuracy in your project?
- What standards have you generated and maintained during this process?
- What have you discovered about your ability to plan?
- How have you learned to use resources?
- How have you learned to solve problems?
- How do you intend to use the knowledge and skills you have gained?
- What have you discovered about your own thinking?
- What have you learned to value about yourself through this process?

While we offer you these guideposts, remember to integrate and synthesize as you offer insight and reflection in writing, rather than simply listing your responses.

Final Reflection Paper Rubric

Scoring Key

3	<i>Exceeds expectations</i>
2	<i>Meets expectations</i>
1	<i>Fails to meet expectations</i>
0	<i>Not Done</i>

REFLECTION

Content _____

- Focuses on guideline questions

Self-assessment _____

- Shows evidence of thoughtful self-assessment

WRITTEN PRESENTATION

Organization _____

- Includes a well-developed introduction, body, and conclusion
- Demonstrates proper paragraphing and effective transitions
- Contains a logical progression of ideas

Usage/Style _____

- Establishes an appropriate tone/ shows awareness of audience
- Shows clear evidence of proofreading/ proper format is used
- No more than two or three minor errors in grammar and usage

Final Grade Breakdown

The final grade for the SISP is based on the following five categories.

Binder/Journal:

You will be graded on how well you follow the process of working toward completion of your SISP. This grade will reflect the outcomes of your meetings with your advisor; the comments recorded by anyone assisting you; the quality and consistency of the entries in your binder/journal, and how well you met the given deadlines.

Mid-Project Reflection:

You will be graded according to the Mid-Project Scoring Rubric included in this packet.

Summary Paper:

You will be graded according to the Summary Paper Rubric included in this packet.

Presentation:

You will be graded according to the Presentation Scoring Rubric included in this packet.

Final Reflection Paper

You will be graded according to the Final Reflection Paper Scoring Rubric included in this packet.

Adherence to Deadlines:

You will be graded on how consistently you met the published deadlines.

You will be graded on the quality of the final product, your ability to clearly demonstrate your acquisition of new knowledge, and your depth of understanding of this new knowledge. The faculty advisor will determine the project grade after the final deadline.

Final Grade Scoring Rubric

Notebook/Journal

Meetings	Proposal	Timeline	Assistance Agreement	Organization	Content
Comments					

Mid-Project Reflection

Content			Written Presentation	
Process	Reflection	Progress	Organization	Usage/Style
Comments				

Summary Paper

Content			Written Presentation	
Abstract	New Knowledge	Process	Organization	Usage/Style
Comments				

Presentation

Mechanics of Presentation	Knowledge of Content	Support Materials	Time Management
Comments			

Final Reflection Paper

Reflection		Written Presentation	
Content	Self-assessment	Organization	Usage/Style
Comments			

Adherence to Deadlines

Notebook/Journal	Mid-Project Reflection	Summary Paper	Final Reflection Paper
Comment:	Comment:	Comment:	Comment: