

STEM COHORT HANDBOOK

Preparing Christians to take the lead in advanced fields of science, technology, engineering, and math.

Overview

Students, with the assistance of Concordia Academy's' Guidance Counselor and STEM Coordinator, plan their academic schedules to ensure that the academic requirements are met. The STEM internship normally takes place during the summer between the junior and senior years. The internship requires a minimum of 40 hours of work at a STEM company site. Students, while assisted by the STEM coordinator, are responsible for finding a mentor and intern site.

The research project and paper are normally planned during the beginning of a participant's junior year. Projects and papers are entered in the Twin Cities Regional Science Fair with the hope of advancing on to the Minnesota State Science and Engineering Fair and possibly the International Science and Engineering Fair (ISEF). Students are required to keep a handwritten, anecdotal logbook for both their internship and research project experiences.

Requirements

- A rigorous curriculum path that includes the equivalent of 5 years of science and the completion of four years of math. One semester of College Calculus counts as a year of math since Calculus meets every day. However, all other college math and science courses count as just one semester or half a year. (**Students must maintain a minimum GPA of 3.0 in the above courses.**)
- Participate in the STEM Cohort community by attending STEM Cohort Conversations, going on field experiences, and attending STEM Cohort meetings.
- An internship with a STEM company.
- A research project and paper designed for and entered into competition through the Twin Cities Regional Science Fair (TCRSF) organization.
- Presentation to a panel of teachers and invited guests of research project results.
- Recognition of the graduating cohort at the Honors Convocation, along with a viewing of the projects at a reception following the Honors Convocation.

Cohort 4-Year Curriculum Plan

Students can see a complete list of required and elective course options in the CA Academic Handbook.

Four Year Course Requirements

Freshmen Year	Sophomore Year	Junior Year	Senior Year
Scripture Math Science English Social Studies PE Fine Arts (Rec)	Scripture Math Science English Social Studies Fine Arts (Rec) Health	Scripture Math Science English Social Studies Foreign Lang (Rec) Elective Elective Elective	Scripture English Social Studies Foreign Lang (Rec) Elective Elective Elective Elective

Cohort Course Options

Freshmen Year	Sophomore Year	Junior Year	Senior Year
Pre-Algebra Algebra Geometry Advanced Algebra Honors Advanced Algebra Physical Science Innovation Lab I Intro to Coding	Algebra Geometry Advanced Algebra Honors Advanced Algebra Pre-Calculus Biology Honors Biology Science of Wellness Innovation Lab I Intro to Coding Engineering & Robotics I	Geometry Advanced Algebra Honors Advanced Algebra Pre-Calculus Calculus I Calculus II College Statistics Chemistry Honors Chemistry Physics Anatomy & Physiology College Biology Science of Wellness Innovation Lab I Innovation Lab II Intro to Coding Engineering & Robotics I Engineering & Robotics II	Advanced Algebra Honors Advanced Algebra Pre-Calculus Calculus I Calculus II College Statistics Physics Anatomy & Physiology College Biology College Chemistry Science of Wellness Innovation Lab I Innovation Lab II Intro to Coding Engineering & Robotics I Engineering & Robotics II Engineering & Robotics III

Students must take:

- **Five years of Science**
- **Four years of Math**
 - One semester of College Calculus counts as a year of math since Calculus meets every day
 - All other college math and science courses count as just one semester or half a year.
- **Students must maintain a minimum GPA of 3.0 in the above courses.**

Field Experience

Students in the STEM cohort will be required to learn about daily life in a STEM career they are interested in. The STEM internship/job shadow normally takes place during the summer between the junior and senior years. The internship requires a minimum of 40 hours at a STEM company. Students, while assisted by the STEM coordinator, are responsible for finding a mentor and intern site.

1. Brainstorm skills and learning experiences that you would like to obtain from your internship/job shadowing experience. Think of people and places you know that may help you achieve your goals. Discuss your internship goals and possibilities with the STEM Coordinator for approval.
2. Once the STEM Coordinator has approved your internship goals and the location of your internship, you will need to complete the following. Click on the link to see examples.
 - a. [STEM letter of introduction](#)
 - b. [Resume](#)
 - c. Fill out the [STEM Internship Agreement Form](#)
3. During your internship, you will need to complete the following. Click on the link to see examples.
 - a. [Introductory Meeting with Supervisor and Reflection](#)
 - b. [Daily logs](#)
 - c. [Halfway Meeting with Supervisor for Feedback and Reflection](#)
 - d. [Exit Interview and Reflection](#)
 - e. Give the supervisor the [Concordia Academy STEM Internship Evaluation](#) with a stamped envelope made out to:
Concordia Academy
Attn: STEM Coordinator
2400 Dale St. N
Roseville, MN 55119
4. Put all the required information and forms together to create your [STEM Internship Portfolio](#).
5. Turn in your completed Internship Portfolio to the STEM Coordinator. Be sure to reference the [STEM Internship Portfolio Rubric](#).

Research

Concordia Academy's STEM students are required to complete a research project and paper. Both the project and paper are designed to qualify for and be entered in the Twin Cities Regional Science Fair. The hope is that students will advance beyond this initial competition to the Minnesota Academy of Science State Science Fair. Students may work on their projects with one or two other students. Students are required to pay the entry fee for both the paper and the project. This fee is per student, not per project.

A wealth of information on both the research project and paper can be found on the [Twin Cities Regional Science and Engineering Fair Website](#). Student research projects and papers are to follow the rules and guidelines found on this site. CA's STEM Coordinator will assist students in sifting through the information found on this site.

1. Brainstorm project ideas for the Science and Engineering Fair.
2. Fill out the [Science and Engineering Fair Project Proposal Sheet](#). Share it with the STEM Coordinator for approval.
3. Once approval for your project is given, the student meets with STEM Coordinator to go over the [Science Fair Handbook](#) and discuss the required forms.
4. Student begins working on their science or engineering project.
5. Students submit their project and paper to the STEM Coordinator so he/she can proofread it before entering it into the fair.
6. Student registers for the fair and submits both project and paper.
7. Students create a physical and virtual display board showcasing their project to bring with them to the Twin City Regional Science Fair. Students need to follow the Science Fair Rules for their display boards. [Project Display Board Guidelines](#)
8. Students attend the Twin Cities Regional Science Fair.

Cohort Community

Students in the STEM Cohort will spend time together sharing ideas, research, problem-solving, and attending cohort conversations.

Students in the STEM Cohort are expected to:

- Attend STEM Cohort Conversations
- Attend STEM Meetings
- Attend field experiences

Capstone

Students in the STEM Cohort will celebrate their work through a public viewing of their Science and Engineering Fair Project, which will be displayed at the cohort showcase in the spring.

1. Students will bring the same Project Display Board they created for the Science and Engineering Fair.
2. After the Honors Convocation, students will stand by their Project Display Boards so they can answer questions that guests may have regarding their project.

Timeline

Follow the timeline below to keep on track with cohort requirements.

Freshman	<ul style="list-style-type: none"> <input type="checkbox"/> Students attend a STEM Cohort introductory meeting <input type="checkbox"/> Students fill out STEM Cohort Student Application <input type="checkbox"/> Students attend STEM Cohort Conversations <input type="checkbox"/> Students attend STEM Field Experiences
Sophomore	<ul style="list-style-type: none"> <input type="checkbox"/> Students check in with the Guidance Counselor to make sure they are on track with fulfilling the course requirements for the program <input type="checkbox"/> Students attend STEM Cohort Conversations <input type="checkbox"/> Students attend STEM Field Experiences <input type="checkbox"/> Students <u>can</u> participate in the Twin Cities Regional Science Fair
Junior	<ul style="list-style-type: none"> <input type="checkbox"/> Students check in with the Guidance Counselor to make sure they are on track with fulfilling the course requirements for the program <input type="checkbox"/> Students attend STEM Cohort Conversations <input type="checkbox"/> Students attend STEM Field Experiences <input type="checkbox"/> Students <u>are strongly encouraged to</u> participate in the Twin Cities Regional Science Fair <input type="checkbox"/> In the Spring, students find a place to complete their STEM internship.
Senior	<ul style="list-style-type: none"> <input type="checkbox"/> Upon returning to school, students submit their Internship Portfolio to the STEM Coordinator <input type="checkbox"/> Students check in with the Guidance Counselor to make sure they are on track with fulfilling the course requirements for the program <input type="checkbox"/> Students attend STEM Cohort Conversations <input type="checkbox"/> Students attend STEM Field Experiences <input type="checkbox"/> Students <u>MUST</u> participate in the Twin Cities Regional Science Fair if they have not yet participated <input type="checkbox"/> Final review of transcript <input type="checkbox"/> Students attend Honors Convocation <input type="checkbox"/> Students share their projects in the Cohort Showcase

Forms

EXAMPLE 1 STEM Letter of Introduction

To Whom It May Concern:

Thank you for considering this proposal for an internship/volunteer opportunity with your organization. I am a student pursuing an advanced science and math curriculum, called STEM, at Concordia Academy in Roseville, Minnesota. Your willingness to help me learn more about this field in a work environment is truly invaluable.

The internship is to comprise at least 40 hours on-site, to be fulfilled in a way agreeable to all parties. I have listed below the objectives for my learning during this internship and I would be happy to discuss or amend these after you've had a chance to consider them.

Learning objectives:

1. Learn the different aspects of a career in environmental biology.
2. Learn how research is done in the field.
3. Learn how to observe and record data.
4. Learn how biologists impact conservation policy.
5. Learn how to educate the public about conservation efforts.

Attached you will find a resume and any other information you may find useful in approving this internship. I look forward to discussing the particulars of this opportunity. Again, thank you for your consideration.

Kind regards,

(Signature in ink here)

Student's typed name.

Student's typed contact information (telephone number and then email typed below the phone number)

EXAMPLE 2 STEM Letter of Introduction

To Whom It May Concern:

Thank you for considering this proposal for an internship/volunteer opportunity with your organization. I am a student pursuing an advanced science and math curriculum, called STEM, at Concordia Academy in Roseville, Minnesota. Your willingness to help me learn more about this field in a work environment is truly invaluable.

The internship is to comprise at least 40 hours on-site, to be fulfilled in a way agreeable to all parties. I have listed below the objectives for my learning during this internship and I would be happy to discuss or amend these after you've had a chance to consider them.

Learning objectives:

1. What kind of materials can be used to produce silica gel? How is it produced?
2. What's the process of purifying silicon (Si) from raw materials like sand and stone?
3. How are new kinds of agricultural seeds invented?
4. How is cooperation between a government oversight organization and a company managed?
5. How does this company develop methods for preventing animal disease on such a large scale?

Attached you will find a resume and any other information you may find useful in approving this internship. I look forward to discussing the particulars of this opportunity. Again, thank you for your consideration.

Kind regards,

(Signature in ink here)

Student's typed name.

Student's typed contact information (telephone number and then email typed below the phone number)

Internship Resume Template

Name

Address

Phone number and email address

Objective: What you hope to learn from the experience

Relevant Classes Completed

List classes that will pertain to or relate to the internship experience

Relevant Skills, Experiences, and Interests

Once again, list only things that pertain to the internship experience

Future Plans



STEM Internship Agreement Form

Intern Name:

Home Address:

Phone: _____

Email: _____

Internship Mentor/Supervisor:

Mentor/Supervisor Job Title:

Work Phone: _____

Work Email: _____

Company Name and Address:

I, (*mentor name/title*) _____

_____ agree to supervise, guide, and direct the above student during his/her entire internship with the intent of exposing the student to learning opportunities in the following areas:

Dates and total hours of the Internship:

I, (*intern name*) _____, agree to complete the Internship program at (*site*) _____

_____ under the supervision and direction of (*mentor*) _____ with the intent of achieving the learning objective(s) as presented in the approved proposal.

The intern, mentor, and parent understand and agree that Concordia Academy does not provide on-site supervision of students engaged in an internship, meetings with a mentor/mentee, or other work-based learning experiences. Parents/guardians must arrange for the transportation of their student to and from the internship location and maintain such insurance coverage that they deem appropriate to protect their student. Under no circumstances will Concordia Academy, its employees, agents, or insurers be held responsible to either the student, the parent/guardian, or the mentor for any injuries or damages to persons or property arising out of the internship, mentor/mentee, or work-based learning experience.

Intern/Mentor/Parent Signatures

Intern Name (printed)	Intern Signature	Date
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Mentor Name (printed)	Mentor Signature	Date
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Parent Name (printed)	Parent Signature	Date
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I, (*CA's STEM Coordinator*) approve the above internship on behalf of the program.

Coordinator Signature	Date
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Introductory Meeting with Internship Supervisor Tips and Reflection

Helpful tips for a successful meeting

1. Dress professionally—no jeans, no T-shirts. Nice slacks and a button shirt. Dress shoes.
2. Thank the Supervisor for the opportunity—remember it is to your benefit you are there, not theirs. Shake their hand and thank them up front for the opportunity.
3. Be flexible—remind them you need to complete 40 hours but that you are flexible with their schedule and will work around what works best for their business.
4. Share your letter of introduction, which also contains your learning objectives.
5. Let them know you are willing to explore any area they feel worthy.
6. Ask questions:
 - What can I contribute to your organization?
 - What are your expectations of me?
 - Are there any special projects you'd like me to complete?
7. Tell them the preferred date you'd like to start and finish.

Student Reflection on Meeting with Internship Supervisor

Reflection Guidelines

For each reflection, type about one page, double-spaced. As you think back on your meetings, address the questions as described below. NOTE: Do not include these questions as headings or in the body of your writing. Simply use them as prompts.

Reflection #1: Following an introductory meeting

- How would you characterize the meeting? Describe how you feel it went.
- What did your mentor seem to be most interested in?
- What expectations were described for you as an intern?
- What are you most looking forward to and what are you most nervous about?

EXAMPLE of Daily Log Template

For each day you attend your internship, complete a journal-type entry that logs your experience on that day. Use the template below.

Date: Day of week, day/month **Time worked:** 9:00-12:45 **Total hours today:**

Location: Where I spent my work time today.

Log: Go for a page. Here are some examples of appropriate topics to reflect on in these logs.

Include specific details about what you did today, what you learned today, and how you feel about how you did today. -

What questions arise for you now?

What feedback did you get from your supervisor?

What were you able to contribute?

What felt new and uncomfortable?

What was interesting and challenging?

Did you take any notes today? You may consider adding them here.

Maybe a sketch of a problem or solution is on your mind. Add it here.

Halfway Meeting with Supervisor for Feedback and Reflection

Reflection #2: Following the half-way-through check-in

- How did you prepare for this meeting? Share some of the questions you asked your mentor about your performance.
- Describe how your mentor gave your feedback about your performance.
- What have you learned so far about working with others in this field?
- What are some of the skills you were surprised to learn are so clearly important for this type of work?

Exit Interview Tips and Reflection

Be sure to thank them. Share with your supervisor what you have learned and what was valuable for you in this experience.

Ask Supervisor...

- What is my potential in this field?
- What advice do you have for me if I continue in this field?
- What do you see as essential skills to succeed in this field?
- Can I use you as a reference?

Give the Supervisor the evaluation sheet with a self-addressed stamped envelope.

Double-check that you have taken a photo with the Supervisor (preferably in front of the business log) for your portfolio.



Concordia Academy STEM Internship Evaluation

To Whom It May Concern:

Once again, thank you for mentoring this student as part of the STEM curriculum at Concordia Academy. The purpose of the internship component is to expose the student to an agency or organization in a STEM field and to have them contribute in a meaningful way to your work environment. Concordia Academy is very interested in your feedback regarding the performance of this student.

Please answer the following questions and return this form to STEM Coordinator at your earliest convenience. Your assessment will play a role in the student's final program evaluation.

Assess the intern for the following items. Feel free to include comments if you wish.

1. Punctuality (Were they on time?)

2. Attendance (Did they come when they were supposed to?)

3. Dress (Appropriate and/or professional?)

4. Attitude

5. Preparedness

6. Ability to learn new things

7. Overall performance

8. Are you interested in having a Concordia Academy senior intern in the future?

9. Are there any qualifications you would like a new intern to have?

10. Additional comments?

Your name and contact information (I invite you to include a business card):

If you have any additional questions or comments, please feel free to contact me by phone or email; otherwise, please return the completed form to me by mail or email.

Once again, thank you!

Elizabeth Bohren
STEM Coordinator
Concordia Academy
2400 North Dale Street
Roseville, MN 55113
651.328.1758
elizabeth.bohren@concordiaacademy.com

STEM Internship Portfolio Contents

1. Cover page
2. Table of Contents
3. Signed forms
4. Reflection on your first meeting/interview for the internship
5. Daily logs
6. Brochures, site map if applicable, business cards, any and all documents that help to tell the story of what you did, with whom, and where.
7. Photographs of you on-site.
8. Final reflection on the whole internship.
9. The evaluation your supervisor filled out.
10. Copy of the thank you letter you sent.
11. A copy of the daily log rubric that will be used to score your portfolio.

STEM Internship Portfolio Rubric

All components will be scored on the following scale:

- + Far exceeds expectations
- ✓+ Exceeds expectations
- ✓- Does not meet expectations
- Far below expectations

NOTE: Any score below a ✓ must be amended before the portfolio is approved as meeting STEM program requirements.

Items	Quality Target	Score
<p><u>Format</u></p> <ul style="list-style-type: none"> ● Cover page ● Table of contents ● This rubric 	<ul style="list-style-type: none"> ● Cover page and Table of Contents in APA format as shown on the Purdue OWL. ● Table of Contents accurately organizes ● All components are included in the portfolio. 	
<p><u>Personal reflections</u></p> <ul style="list-style-type: none"> ● Following first meeting ● Following half-way progress check ● Final reflection after evaluation meeting 	<ul style="list-style-type: none"> ● Dated and titled ● References are made to specific details brought up in the meetings with supervisors. ● Shows evidence of critical thinking and posing questions that have come from that thinking. 	
<p><u>Forms</u></p> <ul style="list-style-type: none"> ● Signed agreements ● Learning objectives form ● Evaluation ● Copy of thank you letter that was sent to supervisor(s) 	<ul style="list-style-type: none"> ● Appropriate pre-internship forms are signed by the supervisor, parent, student, and STEM Coordinator ● Final evaluation is included, either having been given back to the student or mailed to STEM Coordinator 	
<p><u>Company Documents and Photos</u></p> <ul style="list-style-type: none"> ● Brochures and other organizational literature ● Maps ● Required photos with supervisor. 	<ul style="list-style-type: none"> ● Documents that help to clarify the nature of the company and of the work are included. ● Appropriate floor plans, grounds map, etc., are included ● Required photographs of the student on-site with the supervisor are included 	
<p><u>Daily Logs</u></p> <ul style="list-style-type: none"> ● Entries are written at the end of every day spent interning. 	<p><u>Daily Headings</u></p> <ul style="list-style-type: none"> ● Include date, location, times, and number of hours <p><u>Entry Content</u></p> <ul style="list-style-type: none"> ● Clear and specific, with detailed information ● Sketches/notes/data are included in most or all entries 	

STEM Coordinator Comments:

Science and Engineering Fair Project Proposal

Student:

Date:

Science Fair Project Title:

Project Idea:

Question (what will be answered?):

Hypothesis (what do you think will happen?):

Procedures (what will you measure?- include a brief description of the steps):

Materials Needed: (what types of supplies will you need for your experiment?)

Resources needed for your research:

Learning Goal ~ why did you choose the topic you did? I choose this topic because I wanted to know the following:

- 1.
- 2.
- 3.

Concordia Academy

STEM Cohort

Student Application

Name _____

Date of application _____

Graduation Year _____

The STEM program is designed for the student who is excited about the areas of science, technology, engineering, and math. The students who are involved in this program are encouraged to take academic classes that will help them prepare for future careers in a STEM-related field. The students will be asked to use their knowledge and curiosity to develop an original science or engineering project and present it at the Twin Cities Regional Science Fair. Students will be provided opportunities to explore careers in the STEM field by completing an internship/job shadow, attending Cohort Conversations, and going on STEM field experiences.

This program is rigorous and requires a passion for STEM that is self-motivated and self-governed. After reading through the requirements of the STEM program, fill out this application to be considered for admission into the program. Return to the STEM Coordinator by _____. Your application will then be reviewed by the STEM Committee.

1. Curriculum Path Progress

List the Science and Math classes you have taken in high school each year. The STEM program requires five science classes and four math classes by graduation.

Grade 9 _____

Grade 10 _____

Grade 11 _____ + _____

Grade 12 _____ + _____

Total Credits to date:

STEM GPA:

2. Internship

The internship is designed to be completed in the summer between your junior and senior years. What careers are you interested in exploring through an internship?

3. Science and Engineering Fair Project and Paper

The Science and Engineering Fair Project and Paper is an independent study of an area of science that interests you. List three possible ideas you could explore that could lead to a Science Fair Project.

1.

2.

3.

4. Why do you want to be a part of the STEM Cohort?

Briefly describe why you would like to be a part of the STEM program. You have listed your preliminary plans above; now explain why you are willing to commit to this program.