

Scholars of Distinction: Integrated STEM Program Overview

Program Criteria Integrated STEM, for purposes of the Minnesota Scholars of Distinction, is defined by the knowledge and skills that must be exhibited by the applicant. Scholars must have acquired a substantive base of scientific, mathematics, and engineering knowledge that reflects a broad and effective integration of STEM content and principles across several disciplines and be able to place science, technology, engineering, and mathematics within the contexts of society and history. Each applicant is expected to effectively use an engineering design process and methods to address relevant questions, problems or significant current issues based in the natural or designed world confronting society.

Assessment Elements The assessment process will involve three reviewers from outside the student's school with science, technology, engineering, or mathematics expertise or interest. Reviewers will use the Scholars of Distinction in Integrated STEM Rubric to evaluate evidence of the academic foundations of science the applicant has acquired and the rigor and impact of the project the scholar has undertaken. (See rubric at end of document.)

Project Specifics Applicants must submit an Integrated STEM project demonstrating scholarly excellence and personal experience with a substantive problem. View the Scholars of Distinction Important Dates document for the current award cycle timeline. The project is to be submitted electronically in a format that is clearly organized. The content must include all of the following items:

1. Personal Statement of one to two pages

- Include a personal description of the importance of the area of science in terms of the scholar's past experience, present studies and future goals.
- Include a clear explanation of how and why the scholar chose the project problem and the research and actions taken to solve or make a significant effort toward a solution.
- Use a word processor and double space.

2. Annotated K-12 Resume

- Describe the pathways and experiences that have led the scholar to qualify as a Scholar of Distinction in STEM
- List the educational experiences that prepared the scholar for excellence in STEM, including specific science or mathematics coursework or training and independent studies.
- Identify the scholar's engagement with the STEM project and the development of skills and understanding.
- Use a word processor and follow a resume format.

3. Annotated bibliography and one page essay

- Prepare an annotated bibliography with a substantial number of readings that provide depth and breadth to scholar's understanding of science, technology, engineering and mathematics.
- Reflect on the readings and prepare a one-page essay on how the readings influenced the project's intent and components.
- Use a word processor and follow a structured format.

4. Project Narrative

Narrative will include:

- Dimensions of scientific pursuit and fundamental skills contributing to the scholar's development of expertise in STEM through each of the following:

A written paper

1. Address a relevant question, problem or significant current issue based in the natural or designed world confronting society.
2. Explore the issue by gathering and evaluates science, technology, engineering and mathematics information related to the issue.
3. Proposes a solution (either a product or process) that utilizes the concepts and ideas from each discipline that reflects a critical analysis, ethical or social considerations, a life cycle assessment of materials (if necessary), and aesthetics.
4. Discuss the long term impact of the solution.

Narrative will demonstrate:

- Substantive base of scientific, mathematic, and engineering knowledge exceeding usual high school science requirements.
- Evidence that the student has developed an innovative solution to a key problem.
- Use of research methodology that includes clear and concise data analysis, precise technical terms and critical thinking to synthesize information and argue the merits of conclusions.

Narrative will display:

- Introduction that identifies scholar's significant commitment to project as well as challenges and successes.
- Key project components are clearly organized and labeled.
- A review of personal growth as well as the project's impact on others.
- Support material used within narrative or referenced and used as addendum(s). Examples may include PowerPoint Presentations, scanned photos, press notices, event programs and Web addresses that link the reviewer to student-prepared material.
- A self-evaluation and any project logs, journals or reports.
- Conclusion with recommendations for others understanding the impact of the designed solution.

5. Optional Presentation(s)

- Document public presentation(s) to audience(s) outside classroom or school environment. Examples may include organizations with an interest or stake in the project, a civic group, peer education, etc. Documentation may include PowerPoint presentations, scripts, outlines, photos, programs and videos.
- Document the application of a patient
- Include evidence of feedback, review or evaluation and personal reflection.

6. Testimonials

- Identify two individuals familiar with the scholar's research and actions related to the project.
- Obtain permission and submit the individual's name, position/title, telephone number and a sentence on why each person was identified.
- Contact may be made with these individuals at the discretion of the reviewers.

Consultants Consultation regarding program expectations and the criteria used to judge projects as provided in the rubrics is available on request. Science project consultants are available through the Minnesota Department of Education by contacting [Doug Paulson](#), (651) 582-8471.

Submission Process

1. Complete the Intent to Apply.
2. View the Scholars of Distinction Important Dates document for the current award cycle timeline.
3. Submit an official transcript via U.S. Mail to Wendy Behrens, Minnesota Department of Education, 1500 Highway 36 West, Roseville, MN 55113. Transcript must be a certified copy sent directly from the applicant's school and must be received by the project deadline. If a transcript is not available, contact Wendy Behrens at (651) 582-8786 regarding alternative evidence that demonstrates the required knowledge base.
4. Complete the elements listed under "Project Specifics", label each document clearly and in PDF format to Wendy Behrens at wendy.behrens@state.mn.us.

Scholars of Distinction Integrated STEM Scoring Rubric follows this document.

Scholars of Distinction: STEM Rubric

Criterion	Components reflect a level of DISTINCTION	Components reflect a level of HONORABLE MENTION	Components reflect a level of AVERAGE	Components do not qualify
<p>Personal Statement (1 to 2 pages) 10 points</p>	<p>Clear and convincing articulation of importance of STEM in terms of past experience, present studies and future goals.</p> <p>Scholar clearly and strongly demonstrates the development of skills over time. The work is articulate and shows a longstanding commitment to research in and application of scientific and mathematics knowledge and skills.</p>	<p>Substantial evidence of importance of STEM in terms of past experience, present studies and future goals.</p> <p>Scholar clearly demonstrates development of skills over time. The work is well-written, and shows a longstanding commitment to research in and application of scientific and mathematics knowledge and skills.</p>	<p>Average and predictable evidence of importance of STEM in terms of past experience, present studies and future goals.</p> <p>Scholar demonstrates the development of some skills over time. The work shows commitment to a weak or small research project.</p>	<p>Sketchy or undeveloped overview of importance of STEM in terms of past experience, present studies and future goals.</p> <p>Scholar has not demonstrated the development of some skills over time. The work does not show commitment to researching the project or the skills to do so.</p>
<p>Annotated K-12 Resume 10 points</p>	<p>Resume reflects education and experiences that have led the student to excel in science, technology, engineering, and mathematics research and application.</p> <p>Academic studies and activities have contributed to significant growth of scientific or mathematical knowledge and skills.</p> <p>Resume preparation demonstrates superior quality for a high school student.</p>	<p>Resume reflects education and experiences that have led the student to succeed in science, technology, engineering, and mathematics research and application.</p> <p>Academic studies and activities have contributed to substantial growth of scientific and mathematics knowledge and skills.</p> <p>Resume preparation demonstrates satisfactory quality for a high school student.</p>	<p>Resume reflects education and experiences that have led the student to engage in science, technology, engineering, and mathematics research and application.</p> <p>Academic studies and activities have contributed to scientific and mathematics knowledge and skills.</p> <p>Resume preparation demonstrates average quality for a high school student.</p>	<p>Resume reflects education and experiences that have led to science, technology, engineering, and mathematics research and application.</p> <p>Academic studies and activities have limited contribution to scientific knowledge and skills.</p> <p>Resume preparation demonstrates poor quality for a high school student.</p>

Criterion	Components reflect a level of DISTINCTION	Components reflect a level of HONORABLE MENTION	Components reflect a level of AVERAGE	Components do not qualify
<p align="center">Annotated Bibliography and one page Essay</p> <p align="center">10 points</p>	<p>Extensive annotated bibliography of readings that support a broad and comprehensive study of project components.</p> <p>The essay shows a superior understanding of the impact the research has had on scholar and others.</p> <p>The writing reflects superior quality for a high school student.</p>	<p>Substantial annotated bibliography of readings showing a broad and comprehensive study of project components.</p> <p>The essay shows a positive understanding of the impact the research has had on scholar and others.</p> <p>The writing reflects high quality for a high school student.</p>	<p>An annotated bibliography of readings that shows an average study of project components.</p> <p>The essay shows some understanding of the impact the research has had on scholar and others.</p> <p>The writing reflects average quality for a high school student.</p>	<p>Undeveloped annotated bibliography of readings that show a cursory study of project components.</p> <p>The essay shows a weak connection of the impact the research has had on scholar and others.</p> <p>The writing reflects poor quality for a high school student.</p>
<p align="center">Project Narrative</p> <p align="center">40 points + 10 points if optional presentation is not included</p>	<p>Significant evidence presented that the scholar knows and is able to use key science, mathematics, and engineering concepts and apply engineering design, as identified in the Project Narrative component of the Project Specifics.</p> <p>Clear and convincing evidence the scholar conducted a valid study including a comprehensive and concise summary of research, activities, and prototype.</p>	<p>Strong evidence presented that the scholar knows and is able to use key science, mathematics, and engineering concepts and apply an engineering design process as identified in the Project Narrative component of the Project Specifics.</p> <p>Substantial evidence the scholar conducted a valid study including a comprehensive and concise summary of research, activities, and prototype.</p>	<p>Evidence presented that the scholar knows and is able to use science, mathematics, or engineering concepts and apply an engineering design process as identified in the Project Narrative component of the Project Specifics.</p> <p>Some evidence of scholarly research, activities, and a prototype is provided and process is unclear.</p>	<p>Lack of evidence that the scholar knows and is able to use science, mathematics, or engineering concepts and apply scientific methods as identified in the Project Narrative component of the Project Specifics.</p> <p>Evidence of research and activities provided were not organized to inform the reader.</p>
<p align="center">Project Narrative</p> <p align="center">10 points + 5 points if optional presentation is not included</p>	<p>A superior approach to the project over an appropriate period of time.</p> <p>An innovative or creative project approach, content and methodology.</p>	<p>A valid approach to the project problem over an appropriate period of time.</p> <p>An innovative or creative project approach, content and methodology.</p>	<p>A limited approach to the project problem over a short period of time.</p> <p>A narrow project approach, content and methodology.</p>	<p>A sketchy approach to the project problem over a short period of time.</p> <p>An ordinary project approach, content and methodology.</p>

Criterion	Components reflect a level of DISTINCTION	Components reflect a level of HONORABLE MENTION	Components reflect a level of AVERAGE	Components do not qualify
<p>Project Narrative</p> <p>10 points + 5 points if optional presentation is not included.</p>	<p>Only relevant information and supporting materials were included and reliability was assessed.</p> <p>Thoughtful reflection on the process, future development and recommendations for others seeking to replicate are included.</p> <p>Organization and writing reflects superior quality for a high school student and precise language appropriate for the STEM community</p>	<p>Relevant information and materials were included and reliability was assessed.</p> <p>Reflection on the process, future development and recommendations for others seeking to replicate are included.</p> <p>Organization and writing reflects high quality for a high school student and language is appropriate for the STEM community.</p>	<p>Limited relevant information and materials were included but reliability may be an issue.</p> <p>Limited reflection and recommendations for others seeking to replicate the process are included.</p> <p>Organization and writing reflects average quality for a high school student and language is adequate for the STEM community.</p>	<p>Relevance of information and supporting materials was not apparent.</p> <p>Reflection and recommendations for others seeking to replicate were not included.</p> <p>Organization and writing reflects poor quality for a high school student and STEM purposes.</p>
<p>Optional Project Presentation</p> <p>15 points</p> <p>or see</p> <p>Project Narrative</p>	<p>Scholar made a public presentation, created a strong method to assess feedback received, and has reflected on the process with maturity and objectivity.</p> <p>Scholar applied for and received a patient for new technology.</p>	<p>Scholar made a public presentation, created a satisfactory method to assess feedback received, and has reflected on the process with maturity and objectivity.</p> <p>Scholar applied for and received a patient for new technology.</p>	<p>Scholar made a public presentation, created a weak method to assess feedback received. Little reflection on the process was evident.</p> <p>Scholar did not apply for a patient.</p>	<p>Scholar made a presentation with limited feedback. Little or no reflection on the presentation was evident.</p>
<p>Testimonials</p> <p>5 points</p>	<p>Identification and contact information provided.</p>	<p>Identification and contact information provided.</p>	<p>Identification and contact information was limited.</p>	<p>Identification and contact information was not provided.</p>