Environment and Natural Resources Trust Fund

2027 Request for Proposal

General Information

Proposal ID: 2027-279

Proposal Title: CREST Groundwork Project

Project Manager Information

Name: Timothy Dudley

Organization: U of MN - Crookston

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Project Basic Information

Project Summary: The Groundwork Project engages rural Minnesota youth in hands-on soil science connecting agriculture, environmental stewardship, and community sustainability through inquiry-based activities delivered via schools, libraries, and campus field trips programs.

ENRTF Funds Requested: $494,000

Proposed Project Completion: June 30, 2030

LCCMR Funding Category: Education and Outdoor Recreation (C)

Project Location

What is the best scale for describing where your work will take place?

Region(s): NW, Central,

What is the best scale to describe the area impacted by your work?

Statewide

When will the work impact occur?

During the Project and In the Future

Narrative

Describe the opportunity or problem your proposal seeks to address. Include any relevant background information.

Rural Minnesota students often have limited access to hands-on STEM experiences, particularly in agriculture, environmental science, and natural resource management. Many schools in these communities lack laboratory equipment, outdoor learning spaces, and opportunities to interact with STEM professionals, creating barriers to engagement and exploration. This gap can limit students' understanding of soil science, environmental stewardship, and sustainable agriculture, as well as their awareness of related career pathways.

The Groundwork Project seeks to address this opportunity by delivering place-based, inquiry-driven STEM programming directly to schools, libraries, and on-campus field sites. By providing interactive investigations—such as soil texture and nutrient analysis, water filtration, erosion modeling, and soil organism studies—students explore the physical, chemical, and biological properties of soil in ways that are relevant to their local communities. On-campus visits further immerse students in laboratory techniques, outdoor observation, and professional guidance, helping them envision future careers in agriculture, environmental science, and natural resources.

This proposal addresses both the educational and geographic inequities that rural youth face, fostering scientific curiosity, environmental literacy, and long-term engagement in STEM, while connecting classroom learning to real-world applications that directly impact local farms, landscapes, and communities.

What is your proposed solution to the problem or opportunity discussed above? Introduce us to the work you are seeking funding to do. You will be asked to expand on this proposed solution in Activities & Milestones.

The Groundwork Project brings hands-on, place-based STEM learning directly to rural Minnesota youth through school visits, library programs, and on-campus field trips. Students explore soil science via inquiry-based investigations such as texture analysis, pH and nutrient testing, water filtration, erosion modeling, and studying soil organisms.

Activities emphasize real-world applications in agriculture, land use, and environmental stewardship, while on-campus visits provide access to laboratories, outdoor learning spaces, and STEM professionals. Students collect and analyze data, draw evidence-based conclusions, and strengthen critical thinking and problem-solving skills.

Funding will support materials, transportation, and curriculum development, enabling CREST to increase STEM access, build environmental literacy, and inspire long-term engagement. This program helps students connect classroom learning to local communities and explore future careers in agriculture, environmental science, and natural resources.

What are the specific project outcomes as they relate to the public purpose of protection, conservation, preservation, and enhancement of the state's natural resources?

The Groundwork Project will increase youth understanding of soil health, water quality, and sustainable land management, fostering conservation and stewardship practices. Students will apply hands-on investigations to analyze soil, observe ecosystem processes, and explore sustainable agricultural methods, promoting the protection, preservation, and enhancement of Minnesota's natural resources. By connecting scientific inquiry to real-world land use and environmental practices, the program cultivates informed, responsible citizens capable of making decisions that benefit local ecosystems, water resources, and soil integrity, supporting the long-term health and sustainability of the state's natural resources.

Activities and Milestones

Activity 1: School Based Soil Investigations

Activity Budget: $163,000

Activity Description:
Objective: Engage students in hands-on inquiry to explore soil properties and environmental stewardship.
Tasks: Conduct age-appropriate investigations, including soil texture, pH and nutrient testing, water filtration, erosion modeling, and soil organism studies.
Implementation: CREST educators deliver lessons at partner schools using prepared kits, worksheets, and interactive demonstrations.
Outputs & Impact: Students collect data, complete worksheets, and gain practical understanding of soil science, conservation, and sustainable agriculture. Impact is measured via pre/post activity surveys and observation of student engagement.

Activity Milestones:

Description	Approximate Completion Date
Develop and refine soil investigation curriculum for Year 1	September 30, 2027
Deliver Year 1 school- and community-based soil investigations; collect student data	June 30, 2028
Evaluate Year 1 outcomes and update curriculum for Year 2	August 31, 2028
Implement Year 2 soil investigations with expanded schools and community programs	June 30, 2029
Conduct Year 3 investigations, synthesize multi-year data, and produce final evaluation report	June 30, 2030

Activity 2: Library & Community Programs

Activity Budget: $186,000

Activity Description:
Objective: Expand access to soil science and environmental education in community spaces.
Tasks: Offer interactive workshops for mixed-age groups using portable materials and demonstrations utilizing the CREST Mobile Lab.
Implementation: CREST staff facilitate hands-on activities that reinforce school-based learning.
Outputs & Impact: Students and community members engage in experiments, record results, and discuss real-world applications. Evaluations include participant feedback and attendance tracking.

Activity Milestones:

Description	Approximate Completion Date
Develop and update workshop plans and materials for library and community soil programs (Year 1)	August 31, 2027
Deliver Year 1 library and community soil programs; collect participant feedback and engagement data	June 30, 2028
Evaluate Year 1 outcomes and revise curriculum/materials for Year 2	August 31, 2028
Implement Year 2 library and community programs, expanding to additional sites and participants	June 30, 2029
Conduct Year 3 programs, synthesize multi-year data, and create final evaluation and dissemination report	June 30, 2030

Activity 3: On Campus Field Experiences

Activity Budget: $145,000

Activity Description:

Objective: Provide immersive exposure to laboratory tools, outdoor learning, and STEM professionals.
Tasks: Students participate in guided field investigations, collect samples, and analyze data.
Outputs & Impact: Enhanced understanding of professional practices, STEM careers, and environmental stewardship. Evaluations include reflections, data recording, and teacher feedback.

Activity Milestones:

Description	Approximate Completion Date
Develop and refine on-campus field trip curriculum, lab activities, and safety protocols (Year 1)	August 31, 2027
Conduct Year 1 on-campus field trips; students participate in hands-on soil investigations and STEM activities	June 30, 2028
Evaluate Year 1 outcomes and update curriculum, labs, and learning materials for Year 2	August 31, 2028
Implement Year 2 on-campus programs with additional students and school partners; collect engagement and data	June 30, 2029
Conduct Year 3 on-campus programs, synthesize multi-year data, and produce final evaluation and dissemination report	June 30, 2030

Project Partners and Collaborators

Name	Organization	Role	Receiving Funds
Amber Murry	University of Minnesota Crookston	Co-Investigator	Yes
Prof. Kristina Walker	University of Minnesota Crookston	Co-Principle Investigator	Yes

Dissemination

Describe your plans for dissemination, presentation, documentation, or sharing of data, results, samples, physical collections, and other products and how they will follow ENRTF Acknowledgement Requirements and Guidelines.
The Groundwork Project will share results and products through multiple channels to maximize participation, awareness, and impact. CREST will provide lesson plans, activity guides, and worksheets to participating schools and libraries, enabling replication and long-term use. Student-collected data and observations will be summarized in accessible reports shared with teachers, community partners, and local agricultural and environmental organizations. On-campus field trips will generate photographic documentation, student reflections, and demonstration samples that can be incorporated into future programming.
Outreach will include presentations at local STEM events, library programs, and community meetings, highlighting hands-on investigations, environmental stewardship, and sustainable soil management. These efforts ensure Minnesotans, particularly rural communities, have direct access to the knowledge generated and can apply it to improve land, water, and soil management practices. All materials and findings will be archived for reuse, promoting the longevity of the program and its collections. Additionally, CREST will publicly acknowledge the support of the Environment and Natural Resources Trust Fund, ensuring transparency and broad visibility of the work accomplished.

Long-Term Implementation and Funding

Describe how the results will be implemented and how any ongoing effort will be funded. If not already addressed as part of the project, how will findings, results, and products developed be implemented after project completion? If additional work is needed, how will this work be funded?
Project results—including student data, lesson plans, and curriculum materials—will be integrated into CREST's ongoing STEM outreach programs for rural schools and community spaces. Hands-on activities and resources will be reused and adapted for future cohorts, ensuring sustainability. CREST will continue funding these efforts through a combination of grants, private donations, and university support, maintaining program delivery beyond the project period. Findings and best practices will also be shared with partner schools and libraries to expand impact, enabling other educators to replicate the activities and sustain engagement in soil science, environmental stewardship, and natural resource education.

Other ENRTF Appropriations Awarded in the Last Six Years

Name	Appropriation	Amount Awarded
Rural Minnesota Mobile Lab: Environmental-Focused Earth Science Education	M.L. 2024, , Chp. 83, Art. , Sec. 2, Subd. 05p	$459,000

Project Manager and Organization Qualifications

Project Manager Name: Timothy Dudley

Job Title: Professor of Chemistry - University of Minnesota Crookston

Provide description of the project manager's qualifications to manage the proposed project.
Dr. Dudley has been a faculty member at the University of Minnesota Crookston for 15 years and has participated in three LCCMR-funded projects, serving as project manager on one. This project focuses on K–12 outreach to expand students' knowledge and experiences in science and technology.

Approximately 5 years ago, Dr. Dudley founded the Center for Rural Education in Science and Technology (CREST) at UMN Crookston and has since been actively involved in planning and implementing CREST activities across Northwest and Central Minnesota, reaching hundreds of students with hands-on, place-based STEM programming. Dr. Dudley's extensive experience in STEM education, program management, and rural outreach ensures effective leadership and successful execution of this project.

Organization: U of MN - Crookston

Organization Description:
The Center for Rural Education in Science and Technology (CREST) was established at the University of Minnesota Crookston in 2022 to provide underserved and underrepresented schools with equitable opportunities in Science, Technology, Engineering, and Math (STEM). CREST's mission is to enhance STEM accessibility in education by offering professional development, classroom instruction, STEM competition support, and on-campus educational experiences for students and educators in grades k–12.
CREST enriches student learning through hands-on inquiry-based activities, strengthens teacher preparation, models innovative instructional design and learning environments, conducts rigorous STEM education research, and collaborates with industry and community organizations. Through these initiatives, CREST supports regional and statewide STEM initiatives, promotes equity in STEM education, and fosters long-term student engagement and career readiness in science, technology, engineering, and math.

Budget Summary

Category / Name	Subcategory or Type	Description	Purpose	Gen. Ineligible	% Benefits	# FTE	Classified Staff?	$ Amount
Personnel								
Amber Murry		STEM Outreach Coordinator, 83% FTE Years 1, 2 & 3 (Base Salary=$61,585 for 10 month appointment, assuming 3% salary increases in Years 2 & 3).			34.9%	2.49		$257,000
Timothy Dudley		Principle Investigator/Project Manager, 1 month summer salary for Years 1-3 (Base Salary=$101,938 for 9 month appointment, assumes 3% salary increase in Years 2 & 3)			38.5%	0.33		$50,000
Undergraduate Assistants		Stipends for undergraduate students who will assist the CREST team with both school year and summer activities (2 students, 500 hours per year for 3 years at $20/hr for Year 1, $22/hr Year 2, $24/hr Year 3)			0%	4.5		$66,000
Temporary and Casual Employee		This category is for undergraduate students who graduate and wish to work the summer after graduation. They are crucial to maintaining continuity in our summer projects. (1 employee, 500 hours for 2 summers at $24, includes fringe)			8.3%	2		$21,000
Kristie Walker		Co-Principle Investigator, 1 month summer salary for Years 1-3 (Base Salary=$100,205: 9 month appointment, assumes 3% salary increase in Years 2 & 3).			38.5%	0.33		$49,000
							Sub Total	**$443,000**
Contracts and Services								
							Sub Total	**-**
Equipment, Tools, and Supplies								
	Tools and Supplies	Mineral samples and tools	Mineral samples and tools for analysis needed to provide students with opportunities to see, touch, and analyze minerals that are fundamental to soil composition. Examples of such supplies are Moh's hardness scale kits, fossil sample kits,					$3,000

			and mineral sample kits. Most of these items are not considered consumable, so these items will be purchased earl in the grant period.					
	Tools and Supplies	Biological soil component kits	These kits provide students an opportunity to see how biological factors can affect soil formation and composition. Examples of such items are ant farms and worm composting bins. These items will need to be purchased at the beginning of the project period and replaced periodically throughout the grant period.					$1,000
	Tools and Supplies	Physical analysis of soil kits	These tools will allow students to collect and analyze the physical aspects of soil such as color and permeability. Examples of such items are infiltration rings, soil sampling probes, and soil color charts and books. These items are generally not considered consumables, so they will be purchased early in the grant period.					$5,000
	Tools and Supplies	Chemical analysis of soil kits	These items will allow students to analyze soil samples for their chemical composition both in the field and in a lab setting. Examples of these items are soil field testing kits, chemicals used in these kits, and calibrated kits for comparison. Most of these items are consumables so they will be replaced often during the 3-year grant period.					$5,000
							Sub Total	**$14,000**
Capital Equipment								
		Augmented Reality Sandbox	Used to model geological formations and provide students hands-on learning related to how	X				$12,000

			environmental factors affect land and soil formation.					
							Sub Total	**$12,000**
Acquisitions and Stewardship								
							Sub Total	**-**
Travel In Minnesota								
	Miles/ Meals/ Lodging	Travel to remote sites with mobile lab (20 trips per year, $140 vehicle rental per trip, $0.26 per mile, 4000 miles per year)	CREST team will be traveling to schools, libraries, county fairs during the school year and summer in NW and Central MN.					$11,500
	Miles/ Meals/ Lodging	Lodging for CREST team on longer trips (3 rooms per trip, 8 trips per year, $150 per room)	Hotels will be needed for some trips to schools or county fairs that are far away from UMC (> 150 miles, 8 out of 20 trips per year)					$11,000
	Miles/ Meals/ Lodging	Meals for full day trips (8 trips per year, 3 persons, $36 extended day per diem rate)	For a few trips every year (8 out of 20 per year), travel will occur over an extended work day or multiple days. Thus, meals will be reimbursed for each person traveling at the University of MN rate for extended travel days.					$2,500
							Sub Total	**$25,000**
Travel Outside Minnesota								
							Sub Total	**-**
Printing and Publication								
							Sub Total	**-**
Other Expenses								
							Sub Total	**-**
							Grand Total	**$494,000**

Classified Staff or Generally Ineligible Expenses

Category/Name	Subcategory or Type	Description	Justification Ineligible Expense or Classified Staff Request
Capital Equipment		Augmented Reality Sandbox	Being able to model in "real-time" how geological and man-made events can shape the land and form soil provides students an opportunity to actively participate in learning, rather than just reading about these processes in a book. **Additional Explanation :** This item is portable, so it will be used by students who come to UMC for visits or can be brought to remote locations (e.g., schools, libraries). It will be used for STEM outreach activities until it no longer works or is obsolete.

Non ENRTF Funds

Category	Specific Source	Use	Status	Amount
State				
			State Sub Total	**-**
Non-State				
			Non State Sub Total	**-**
			Funds Total	**-**

Total Project Cost: $494,000

This amount accurately reflects total project cost?

Yes

Attachments

Required Attachments

Visual Component

File: ee9e6f28-b08.pdf

Alternate Text for Visual Component

CREST Promotional Bookmark...

Supplemental Attachments

Capital Project Questionnaire, Budget Supplements, Support Letter, Photos, Media, Other

Title	File
Board of Regents Approval Letter	446f6920-56a.pdf
Support Letter-Kittson County	e6a82cec-a93.pdf
Support Letter-Regional 4H	7deeb445-db8.docx
Support Letter-Fisher Schools	fc7c851a-374.pdf

Administrative Use

Does your project include restoration or acquisition of land rights?

No

Do you understand that travel expenses are only approved if they follow the "Commissioner's Plan" promulgated by the Commissioner of Management of Budget or, for University of Minnesota projects, the University of Minnesota plan?

Yes, I understand the UMN Policy on travel applies.

Does your project have potential for royalties, copyrights, patents, sale of products and assets, or revenue generation?

No

Do you understand and acknowledge IP and revenue-return and sharing requirements in 116P.10?

N/A

Do you wish to request reinvestment of any revenues into your project instead of returning revenue to the ENRTF?

N/A

Does your project include original, hypothesis-driven research?

No

Does the organization have a fiscal agent for this project?

Yes, Sponsored Projects Administration

Does your project include the pre-design, design, construction, or renovation of a building, trail, campground, or other fixed capital asset costing $10,000 or more or large-scale stream or wetland restoration?

No

Do you propose using an appropriation from the Environment and Natural Resources Trust Fund to conduct a project that provides children's services (as defined in Minnesota Statutes section 299C.61 Subd.7 as "the provision of care,

treatment, education, training, instruction, or recreation to children")?

Yes

Do you certify that background checks are performed for background check crimes, as defined in Minnesota Statutes, section 299C.61, Subd. 2, on all employees, contractors, and volunteers who have or may have access to a child to whom children's services are provided by your organization?

Yes

Provide the name(s) and organization(s) of additional individuals assisting in the completion of this proposal:

Donna Larson, University of Minnesota Crookston Finance Professional

Do you understand that a named service contract does not constitute a funder-designated subrecipient or approval of a sole-source contract? In other words, a service contract entity is only approved if it has been selected according to the contracting rules identified in state law and policy for organizations that receive ENRTF funds through direct appropriations, or in the DNR's reimbursement manual for non-state organizations. These rules may include competitive bidding and prevailing wage requirements

N/A