Environment and Natural Resources Trust Fund
2020 Request for Proposals (RFP)

Project Title: **ENRTF ID: 133-C**

Delivering Student-Centered Environmental Education to Minnesota Students

Category: C. Environmental Education

Sub-Category:

Total Project Budget: $ 610,000

Proposed Project Time Period for the Funding Requested: June 30, 2023 (3 yrs)

Summary:

This project will provide student-centered environmental education to over 15,000 Minnesota students by expanding currently existing in-classroom programs over a three year period.

Name: Seth Thompson

Sponsoring Organization: U of MN

Job Title:

Department: Biology Teaching and Learning

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Location:

Region: Metro

County Name: Anoka, Dakota, Hennepin, Ramsey

City / Township:

Alternate Text for Visual:

Flyer describing the core principles and stucture of the InSciEd Out program

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%

PROJECT TITLE: Delivering Student-Centered Environmental Education to Minnesota Students

I. PROJECT STATEMENT

In the land of 10,000 lakes, clean water is a central part of the culture of Minnesota. By providing high-quality, inquiry-based educational programing focused on water to young students, we help build the next generation of Minnesotans who care about the natural world and have the tools, knowledge, and networks to protect it. **The primary goal of this project is to cultivate the next generation of environmental stewards by providing inquiry-based learning opportunities in the environmental sciences to Minnesota students.**

This project will result in the delivery of environmentally focused curriculum to approximately ~**6000 new K-12 students** over the 3 year project. This will be accomplished by doubling the reach of the existing environmental education program called Integrated Science Education and Outreach (InSciEd Out). By the end of the project, this funding will have supported programming for **~15000 students in total** (4k the first year of the project, 5k the second year, and 6k the third year). We propose to target our expansion efforts by focusing on schools in the Minneapolis, St. Paul, and the surrounding suburbs. Based on the demographics of targeted partner schools, many of these students will represent populations underserved in science. Additionally, this project with provided professional development for **60 new teacher partners** and supplementary professional development for **30 current teacher partners.** InSciEd Out will also provide training in science communication and outreach for **30 undergraduate students** over the course of the three year project**.**

Integrated Science Education and Outreach (InSciEd Out) provides authentic environmental science experiences to underrepresented and low socioeconomic status students in the West St. Paul, Richfield, and White Bear Lake school districts as well as professional development training for their teachers. Currently, our program reaches ~3,000 students annual across 6 partner schools. We provide in class curricula that are aligned to the MN State science standards covering some of the most pressing environmental topics in the state. This includes classroom programs focused on the effects of road salt on aquatic ecosystems, contaminants of emerging concern, and land use change. In short, the program uses an initial professional development experience to build scientist-teacher partnerships that result in the implementation of InSciEd Out curriculum that addresses grade specific education standards through environmentally focused learning modules.

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: InSciEd Out Professional Development Internship for K-12 Science Teachers **Budget: $110,00**

The adult internship is a 12-day summer professional development program where teachers from partnering schools receive training in the areas of pedagogy, dialogue, nature of science, and environmental science. The internship is developed specifically to increase teacher preparedness in implementing cutting-edge environmental modules in their classrooms. Nature of science training allows teachers to better understand the process of science and how scientific understandings are developed. Teachers then use this new understanding to bring high-level science into their own classrooms and develop a culture of scientific thinking in their schools. Once teachers have participated in this initial internship, they are eligible to participate in additional 1-week focused programs that promote additional development of science identify and content knowledge.

Outcome	Completion Date
1. 60 new teacher partners implementing InSciEd Out Curriculum (20 per year)	*June 2023*
2. Advanced training for 30 existing teacher partners (10 per year)	*June 2023*

Activity 2: Implementation of InSciEd Out Curriculum in new classrooms. **Budget: $500,000**

The InSciEd Out environmental curriculum works by pairing stewardship experiences (i.e. naturalism) with inquiry-based environmental science. Students are engaged with an initial guided experience (outdoors, naturalism) and asked to use that experience to develop scientific questions related to the environment. In the guided experience, students would perform basic monitoring on a water body near their school (temp, pH, DO, DOC, TDN, etc) or simply observe the different types of vegetation growing in a nearby wetland. This experience

is than followed by an extension project, where students use those data to drive deeper questions about how changing ecosystems may impact organisms. For example, students may notice an oxygen concentration gradient in their nearby lake during the warmer months, which could drive questions related to testing the effects of oxygen availability on microbial processes or an extension related to eutrophication driven hypoxia. Throughout the extension phase of the module, students work closely with scientist partners from the University of Minnesota (primarily undergraduate student interns) to plan and execute independent projects related to an environmental problem. In this manner, InSciEd Out not only benefits our K-12 partner students, but we provide opportunities for undergraduate students to build their skills in science communication and outreach through our research mentor internship program. To assess the effectiveness of our modules, student learning over the course of the InSciEd Out module is assessed using a variety of techniques, including talking drawing analysis, pre/post surveys, connectedness to nature surveys, and performance on the MCA science test (when grade appropriate). These results are used to continually improve our curricular products.

Outcome	Completion Date
*1. Provide research-based environmental curriculum to **~1000 new students annually** over the course of the project resulting in double the size of the existing programs to 6,000 annual students served*	*June 2023*
*2. Provide science communication and outreach training for **10 undergraduate research mentors** each year for a total of **30 trained mentors** over the course of the project*	*June 2023*

III. PROJECT PARTNERS AND COLLABORATORS:

Seth Thompson (Teaching Specialist in the Department of Biology Teaching and learning at UMN-TC): Aquatic Science Expertise; Educational Researcher, and InSciEd Out Twin Cities Program Leader. Current Twin Cities school partners included **Heritage E-STEM** and **Henry Sibley High School** in West Saint Paul, **Richfield STEM** School, and **Willow Lane Elementary** in White Bear Lake, Potential partner schools include **Weaver Lake Elementary** and **Minnesota Excellence in Learning Academy** in Maple Grove, **Hoover Elementary** in Anoka, and additional schools within our current partner districts and the Minneapolis and St. Paul Public School Districts.

IV. LONG-TERM IMPLEMENTATION AND FUNDING:

Over the course of this three year projects, we aim to double the reach of our existing programming and develop a sustainable model for continued expansion. Currently, we are best situated to provide opportunities for students within a 25 mile radius of the University of Minnesota campus because we rely heavily on equipment sharing and providing volunteers from the University of Minnesota. More recently however, we have started to explore the possibilities and logistics associated with expanding our programming to Greater Minnesota. While we are not currently situated to recruit partners outside of the Twin Cities metro area, funding from this proposal would provide the opportunity to continue our expansion within the metro area and allow for additional time to more fully plan for an expansion to Greater Minnesota. This would include developing the necessary partnerships, with both school districts and scientific partners, to adequately provide programing away from the main campus of the University of Minnesota. Ultimately, the goal is to be able to offer access to high-quality environmental education opportunities to students across the entire state of MN.

As for financial sustainability, InSciEd Out has a track record of varied and well-leveraged financial relationships. Currently in the Twin Cities, our work is supported through a federal grant from the National Institute of General Medical Science to Dr. Chris Pierret (Mayo Clinic), previous Schulze Foundation Grants, cost sharing with the Department of Biology Teaching and Learning, and Sales and Service agreements with partner schools. Additionally, schools have successfully written small grant applications to support supply needs for our curricular units. This breadth in funding allows us to leverage funding to better meet the goals of our funders. Further, it allows a sustainability that is rare in science and education partnerships.

Attachment A: Project Budget Spreadsheet
Environment and Natural Resources Trust Fund
M.L. 2020 Budget Spreadsheet
Legal Citation:
Project Manager: Seth Thompson
Project Title: Delivering Student-Centered Environmental Education to Minnesota Students
Organization: University of Minnesota Twin Cities
Project Budget: 610,000
Project Length and Completion Date: 3 year project ending July 2023
Today's Date: 3.15.2019

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Budget	Amount Spent	Balance
BUDGET ITEM			
Personnel (Wages and Benefits)	$ 557,000	$ -	$ 557,000
Project Manager: Seth Thompson (1.0 FTE in each year; 74% salary, 26% benefits), $250,000			
InSciEd Out Recruitement Coordinator (0.5 FTE in years 2 and 3; 77% salary, 23% benefits), $59,000			
Graduate Student Support (0.5 FTE years 1-3; 52% salary, 48% benefits during the academic year & 86% salary, 14% benefits during the summer), $146,000			
Undergraduate Student Support (~1.0 FTE years 1-3; 100% salary, 0% benefits), $102,000			
Professional/Technical/Service Contracts			
	$ -	$ -	$ -
Equipment/Tools/Supplies			
Wifi connected Microscopes- 25 scope at $500 per unit, this costs includes both the microscope and a tablet to connect to the microscope	$ 12,500		$ 12,500
Portable incubators for classroom zebrafish work- 3 incubators at $500 per	$ 1,500		$ 1,500
Enviroscape watershed model	$ 1,000		$ 1,000
Consumable supplies: $10,000 per year based on current program costs for consumable classrooms supplies in support of student work (~$1-$3 per student served per year depending on the specific activities) and the proposed scope of work. These funds would cover things like petri dishes, pipettes, zebrafish husbandry costs, chemicals for student projects, etc.	$ 30,000	$ -	$ 30,000
Capital Expenditures Over $5,000			
	$ -	$ -	$ -
Fee Title Acquisition			
	$ -	$ -	$ -
Easement Acquisition			
	$ -	$ -	$ -
Professional Services for Acquisition			
	$ -	$ -	$ -
Printing			
	$ -	$ -	$ -
Travel expenses in Minnesota			
Mileage reimbursement at the rates set by Univeristy of Minnesota policy for InSciEd Out Staff traveling to partner schools to support student programs. Based on current cost, we estimate this to be ~$2,667 per year for the scope of programming we have proposed. Based on the current mileage rate of $0.58 per mile and a maximum distance of 50 miles round trip, this would support ~90-100 school trips per year (about 2-3 per week during the school year) to support in classroom programming.	$ 8,000	$ -	$ 8,000
Other			
	$ -	$ -	$ -
COLUMN TOTAL	$ 610,000	$ -	$ 610,000

SOURCE AND USE OF OTHER FUNDS CONTRIBUTED TO THE PROJECT	Status (secured or pending)	Budget	Spent	Balance
Non-State:			$ -	$ -
State:		$ -	$ -	$ -
In kind: Indirect costs associated with this proposal @ 54% MTDC	Secured	$ 303,000	$ -	$ 303,000

Other ENRTF APPROPRIATIONS AWARDED IN THE LAST SIX YEARS	Amount legally obligated but not yet spent	Budget	Spent	Balance
		$ -	$ -	$ -

About InSciEd Out

Mission Statement

To provide all students with opportunities to conduct community-driven science

Twin Cities Milestones

2012	Initial partnership meetings with West Saint Paul Public Schools
June 2013	Inaugural cohort of InSciEd Out teacher leaders trained
Spring 2014	First environmental curricula piloted at Heritage E-STEM
June 2015	Expansion of Programing to Richfield and White Bear lake
Fall to Spring 2017	Curriculum design and curricular runs at 6 partner schools
June 2018	Third iteration of Twin Cities teacher partner internship; cross the 60-teacher partner threshold

Core Values

- Equity and Accessibility
- Collaboration through Partnership
- Science as a lived experience

Program Background

Science. It's at the center of every medical advancement, countless historical milestones, and our ordinary, day-to-day experiences. Science moves us. Heals us. Connects us. Teaches us. That's why we're committed to ensuring every student—in every walk of life—has access to quality science education.

InSciEd Out is not about teaching science. It's about **rebuilding** science education at its core for students, teachers, and entire communities. All students deserve access to quality, authentic science education. Our goal is to help these students—and the communities they live in—become healthier and experience the power of science firsthand.

We train teachers to deliver hands-on science curriculum that excites students while meeting education standards. Participating teachers will learn how to develop engaging curriculum and teaching techniques using real-life science experiments to drive student-led research, inquiry and engagement. Students will learn how to ask questions and discover their own answers to prepare them for our science- and tech-focused world.

Project Manager Qualifications
Seth Thompson is a teaching specialist in the College of Biological Sciences at the University of Minnesota in the department of Biology Teaching and Learning. He is the current leader of the InSciEd Out Program Twin Cities hub. He has experience in studying freshwater ecosystems, particularly with respect to issues related to nutrient cycling. He also has worked with the InSciEd Out program for over 5 years, helping develop a K-10 environmental science curriculum that is based on student-led inquiry. He has trained over 60 teachers in the Twin Cities area and supported programming for over 6,000 students over this time period. His role in the proposed project to oversee the expansion of InSciEd Out programming by working with potential district partners, recruiting new teacher partners, and managing the budget and administrative tasks of the proposed project.

Organizational Description

Integrated Science Education and Outreach (InSciEd Out) Twin Cities: InSciEd Out is an evidence-based K-10 science program that empowers young learners to investigate society's most pressing environmental health issues, so they can ignite measurable and sustainable changes in the health and wellness of their families and communities. An undertaking of this magnitude is possible because InSciEd Out partner schools share our vision for transforming the classroom into an incubator for innovation. Through summer internships with University of Minnesota and Mayo Clinic scientists, teachers from all disciplines in a single school receive expert training in research methodology and hands-on, environment-related curriculum that immerses students in scientific inquiry throughout the school day. The result is a community of learners who see themselves as scientists, asking questions and uncovering evidence to support a wide array of hypotheses. As educators, we strive to see students excel — not just academically, but personally and socially so they can achieve their true potential. Increasingly, excelling in tomorrow's workforce will require critical thinking skills, scientific curiosity, and technological aptitude. By demystifying science and instilling healthy behaviors, InSciEd Out encourages students to reach new heights and open the door to their future.