Environment and Natural Resources Trust Fund
2019 Request for Proposals (RFP)

Project Title: **ENRTF ID: 128-C**

Driven to Discover: Implementing Citizen Science in Classrooms

Category: C. Environmental Education

Sub-Category:

Total Project Budget: $ 262,314

Proposed Project Time Period for the Funding Requested: June 30, 2021 (2 yrs)

Summary:

Driven to Discover will improve science education and increase knowledge about Minnesota's natural resources by helping teachers implement curriculum for citizen science projects focused on birds, phenology, dragonflies, and pollinators.

Name: Robert Blair

Sponsoring Organization: U of MN

Title: Professor

Department: Fisheries, Wildlife, and Conservation Biology

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Location

Region: Statewide

County Name: Statewide

City / Township:

Alternate Text for Visual:

Teachers attend workshops on natural-resource-based citizen science projects covering birds, phenology, dragonflies, and pollinators. They implement curricula on these projects in their classroom where students contribute data to each project.

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ TOTAL	_____%
____ If under $200,000, waive presentation?			

PROJECT TITLE: Driven to Discover: Implementing Citizen Science in Classrooms

I. PROJECT STATEMENT

The goal of *Driven to Discover* is to improve science education in Minnesota and to increase knowledge about Minnesota's natural resources by helping teachers implement in the classroom nationally recognized environmental citizen science projects. Citizen Science is science that involves regular citizens in the generation of data about their world. The Driven to Discover program will offer teachers an intensive two-week-long summer workshop on citizen science curricula covering birds, phenology, dragonflies, and pollinators that they can use in their classrooms. The teachers will then implement these programs in their schools where their students will generate data about these topics and contribute that information to national databases used by scientists and natural resource managers. The summer workshop will be followed by two, separate, day-long refresher workshops held during the school year. Finally, a subset of the teachers' students will participate in a state-wide ecology science fair held at the University of Minnesota where the students will present the results of investigations based on their citizen-science projects.

Need: The program is based on three demonstrated premises: 1) a teacher's participation in citizen science projects leads to important science education outcomes for students, 2) students excel in science when conducting citizen-science research in their schoolyard areas using observation skills, collecting and analyzing data, and communicating results, 3) students gain a solid foundation for conducting independent investigations based on their citizen-science projects and the skills learned in conducting the projects. As a result of this course, teachers will build confidence around citizen-science experiences and will be better prepared to teach Minnesota State Science Standards, connect to relevant Minnesota Math Standards and ELA Common Core Standards, and utilize appropriate technology to support these goals. Such support for teacher development around science concepts and processes helps students develop images of themselves as scientists. The data collected by students working on these citizen science projects will be cataloged in national databases for use by environmental scientists and natural resource managers.

Goals and Outcomes. The goal of Driven to Discover is to improve science education in Minnesota and to increase knowledge about Minnesota's natural resources by helping teachers implement nationally recognized environmental citizen science projects in the classroom. The direct outcomes are to:

1) instruct 36 teachers each year for two years in one of four citizen science projects – eBird (birds), the Minnesota Phenology Network (phenology), Odonata Central (dragonflies), and Project Sunflower (pollinators);
2) train these teachers in the use of existing curricula developed at the University of Minnesota that were written specifically for each of these projects;
3) help these teachers implement these projects and curricula in their classrooms during the school year;
4) have students contribute information on Minnesota's birds, phenology, dragonflies, and pollinators to national databases; and
5) have students present findings from their independent investigations based on these citizen-science projects at an Ecology Science Fair attended by students from across Minnesota.

Process: Each year, the project will occur in three steps:

1) Teachers will attend a two-week long summer workshop that will train them in one of four citizen science projects and the curricula that have been expressly written for each project. This workshop will occur the University of Minnesota Twin Cities campus.
2) Teachers will implement the skills they have developed at the summer workshop in their classroom, leading students to contribute data to one of the four environmental citizen-science projects. The students will then use this experience as a springboard to conduct their own independent investigation based on the topic of the citizen science project.

3) A subset of students will present their study and findings at a state-wide Ecology Science Fair held at UMN

II. PROJECT ACTIVITIES AND OUTCOMES

Activity 1: ***Teachers learn citizen science protocols and implement them in the classroom so students can contribute to national citizen science databases.***

ENRTF BUDGET: $254,506

Teachers will attend a two-week long summer workshop on citizen science. The first week, the teachers will be immersed in the biology and processes of science behind one of the four nationally-recognized citizen science projects. The second week, the teachers will present the findings from their projects and devise implementation plans based on curricula written for each of the focal citizen-science projects. During the following school year, teachers will reconvene for two Saturdays to discuss implementation and reinforce their citizen-science skills. This cycle will occur twice – in 2019-2020 and 2020-2021.

Outcome	Completion Date
1. Train 72 teachers at two-week long summer workshop on citizen science.	*8-20*
2. Teachers implement citizen science projects in their classrooms.	*5-21*

Activity 2: ***Students present independent investigations based on citizen-science projects at ecology science fair.***

ENRTF BUDGET: $7,808

Students will present the results of independent investigations based on the citizen-science projects that their teachers have brought back to the classroom. The venue for these presentations will be the annual Ecology Science Fair held at the University of Minnesota. This science fair has been held since 1997 and regularly draws hundreds of students and their teachers from across Minnesota. This event will occur twice – in the 2019-2020 and 2020-2021 school years.

Outcome	Completion Date
1. Students generate and contribute data to national environmental citizen science projects	*5-21*
2. Students present their work at a state-wide Ecology Science Fair.	*5-21*

III. PROJECT PARTNERS:

A. Partners receiving ENRTF funding

Robert B. Blair, Professor, University of Minnesora, Project Director and Instructor
Michele Koomen, Professor, Gustavus Adolphis College, Instructor

B. Partners NOT receiving ENRTF funding

Marshall Davis, Supervisor: Science PreK-12, Saint Paul Public Schools, Instructor
Renae Lenhardt, Secondary Science Teaching and Learning Specialist, Anoka-Hennepin Schools, Instructor

IV. LONG-TERM- IMPLEMENTATION AND FUNDING:

This project will continue the teacher outreach and professional development efforts that Rob Blair and Karen Oberhauser have been conducting at the University of Minnesota for over 15 years. This particular phase will stress the implementation of curricula that were developed from 2014 – 2018 with funding from the National Science Foundation (NSF). After these two years of dissemination, we hope to obtain additional funds from NSF to further develop materials for implementing citizen science in the classrooms of Minnesota.

V. TIME LINE REQUIREMENTS:

Driven to Discover – Implementing Citizen Science Projects in the classroom will take two years to complete. One cohort of 36 teachers will participate in the program each school year: 2019-2020 and 2020-2021. This project is scalable in that each year is independent and repeated. Optimally, it would be offered for four years in order to build cohorts of trained teachers within school buildings.

2019 Proposal Budget Spreadsheet

Project Title: Driven to Discover: Implementing Citizen Science in Classrooms

IV. TOTAL ENRTF REQUEST BUDGET *2* **years**

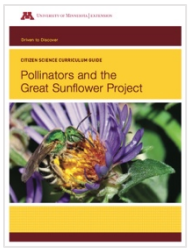
BUDGET ITEM (See "Guidance on Allowable Expenses")	**AMOUNT**
Personnel: Robert Blair, Project Manager (75% salary, 25% benefits); 8.3% FTE for 2 years, $29,512 Teacher Liaison (75% salary, 25% benefits); 29.1% FTE for 2 years, $46,582 Program Coordinator (75% salary, 25% benefits); 25% FTE for 2 years, $44,662 Phenology/Dragonfly/Pollinator Scientists (75% salary, 25% benefits); 4.2% FTE per for 2 years, $14,770	$ 135,526
Professional/Technical/Service Contracts: Gustavus Adolphus subaward, Michelle Koomen, Assistant Manager (75% salary, 25% benefits); 4.2 FTE for 2 years, $12,180 Lead Teachers (4 teachers, $3000 per teacher) for 2 years, $24,000 Teacher Stipends (72 teachers, $1000 per teacher), $72,000	$ 108,180
Equipment/Tools/Supplies: Books and course materials ($150/teacher, 72 teachers)	$ 10,800
Additional Budget Items: Facilities rental for Ecology Science Fair, repeated for two years	$ 7,808
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND $ REQUEST =	$ 262,314

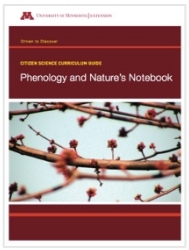
V. OTHER FUNDS *(This entire section must be filled out. Do not delete rows. Indicate "N/A" if row is not applicable.)*

SOURCE OF FUNDS	**AMOUNT**	**Status**
Other Non-State $ To Be Applied To Project During Project Period:	N/A	*N/A*
Other State $ To Be Applied To Project During Project Period:	N/A	*N/A*
In-kind Services To Be Applied To Project During Project Period: Rob Blair will work an additional 4% FTE for 2 years as part of his academic duties. ($14,756) IDC not recovered by University of Minnesota ($137,433)	$ 152,189	*Secured*
Past and Current ENRTF Appropriation: M.L. 2011, First Special Session, Chp. 2, Art.3, Sec. 2, Subd. 08b: Minnesota Junior Master Naturalist: An After-School Program M.L. 2015, Chp. 76, Sec. 2, Subd. 03g: Minnesota Native Bee Atlas: A Citizen Science Project	$365,000 $790,000	*Complete* *In-Progress*
Other Funding History:	N/A	*N/A*

1. Teachers attend a two-week workshop on one of four citizen science projects.

2. Teachers implement citizen science projects in their school using existing curricula, while students contribute data on birds, phenology, dragonflies, and pollinators to national databases.





3. Students present investigations based on their citizen science projects at an all-state ecology science fair.

Project Manager Qualifications:

Dr. Rob Blair is a Professor of Fisheries, Wildlife, and Conservation Biology in the College of Food, Agriculture and Natural Resource Science at the University of Minnesota. Currently, he is the principal investigator of a National Science Foundation-funded project that is examining how citizen-science projects can be used as a springboard to authentic scientific inquiry by secondary students. This project developed the curricula for the four nationally recognized citizen science projects – eBird (birds), Minnesota Phenology Network (phenology), Odonata Central (dragonflies), and Project Sunflower (pollinators) that will be used in this proposed project. In this role, Dr. Blair supervises two full-time employees and a graduate student. He also coordinates the research and work of three co-principal investigators who participate in the project. His role for the Driven to Discover project will be similar. He will hire and oversee a part-time coordinator and a part-time teacher liaison to handle the day-to-day functioning of the project, teacher recruitment, and teacher coaching during the school year. For the summer workshops, he will work with an additional four scientists with expertise in the four citizen-science projects and with an additional four lead teachers with expertise in classroom implementation.

Dr. Michelle Koomen is a Professor in Education at Gustavus Adolphus College where she works in teacher preparation. She was heavily involved in the research phase of Driven to Discover and in developing the curricula that will be used in this phase of dissemination. Her role will be to assist the participating teachers in planning for implementation of the curricula during the school year.

Dr. Marshall Davis is the preK-12 Science Supervisor for the Saint Paul Public Schools. In this role, he is responsible for the professional development of science teachers within the district. For this project, he will serve as an instructor on leadership within the school setting for the participating teachers. He will be involved in both teacher recruitment prior to and teacher implementation after the workshops.

Renae Lenhardt is the Secondary Science Teaching and Learning Specialist for the Anoka-Hennepin School District. In this role, she is responsible for the professional development of secondary science teachers within the district. For this project, she will serve in an identical role as Dr. Davis but with her efforts directed in the Anoka Hennepin district.

Organization Description:

This proposed project is one of a series of professional development workshops implemented by Dr. Rob Blair and Dr. Karen Oberhauser over the past 15 years. These have been funded through grants from the Minnesota Office of Higher Education and the National Science Foundation, which has allowed these workshops to be honed in content, pedagogy, and usefulness to teachers.

This specific professional development workshop and accompanying curricula were developed from 2014 – 2018 with a grant from the National Science Foundation (NSF). This proposal is to offer the professional development workshops to an additional total of 72 teachers over two years and to disseminate the curricula that have already been developed through the beneficence of the NSF.

Note: This project includes a stipend of $1000 for each teacher who participates in the program. This is equivalent to $12.50/hr of work which is half of the rate recommended for teacher professional development by the Saint Paul Public School District. Our prior experience in teacher professional development has shown that stipends are required for teacher participation during the summer when they are not paid.