



Dartmouth Rural STEM Educator Partnership

An educational outreach project funded by SEPA-NIGMS

PROJECT INFORMATION

2022-2023 Academic Year

Overview

Middle school teachers, especially those in low-income rural areas, often lack the training, time, and especially the resources necessary to develop and implement effective, hands-on, STEM curricular units. To support STEM education at the middle school level and spark and maintain student interest in STEM, our team is partnering with science teachers in four low-income rural schools in NH and VT. Working with teachers, we will collaboratively develop and implement a series of crosscutting units aligned with next generation science standards (NGSS) that will pique and maintain middle school student interest in STEM. We will also create a critically needed sustainable rural STEM teacher network and provide STEM role models and near-peer mentors for middle school students, and finally, we will roll out the units we develop to other schools in NH and VT and beyond.

Our objectives are to assist teachers in the development of new, inquiry-based curricular units, enhance teachers' ability to network, increase students' interest in science and their science literacy, and expand student awareness of STEM careers. The project will thus benefit two components of the STEM pipeline: (1) teachers in low-income rural areas who will benefit from collaborative assistance in developing hands-on STEM units, acquiring the supplies and equipment required, and a new professional network and space for virtual collaboration, and (2) low-income rural middle school students who will be engaged by high quality STEM learning experiences and near-peer mentoring.

Graduate students play an important role in the SEPA-NIGMS project. They serve as near-peer mentors and role models for middle school students, and collaborate with the teachers and the project team in the development and implementation of new teaching units.

The Dartmouth SEPA-NIGMS project will provide a stipend of \$4,000 (in addition to the fellowship support each student currently receives) to each participating graduate student. The stipend will be issued in two allotments toward the end of the fall and spring terms. Up to ten graduate students will be involved in the project each year.

Below is a summary of how the project will unfold this academic year:

Fall term: In early fall, graduate students will be asked to complete a pre-program questionnaire by the project evaluator. Also early in the fall, the topic for the year will be decided by the teachers. When that has been determined, graduate students will attend one or

two, day-long ideation sessions to define the content of the STEM topic to be addressed for this academic year. In attendance will be project faculty from Dartmouth, Montshire Museum education staff, middle school teachers from the four targeted schools, and graduate student mentors. The topic selected by the middle school teachers will most likely be one in which they feel they have the least expertise. Once a topic is selected, the project team will decide what the middle school students should understand to master the topic at their grade level. During the remainder of the fall term, the project team will meet to develop and test the details of the procedures, tasks, supplies and equipment required for the instructional activities teachers and students need to address the topic in their classrooms. The whole group will determine specific components of the project, but then sub-groups will work at their own pace (but cognizant of time deadlines), on specific aspects of the unit. As examples, these components might include: (i) assembling an inventory (on paper) of the required materials, chemicals, and equipment for the project, which will be purchased with SEPA grant funds; (ii) writing a protocol of the steps and stages for the teacher to use as they roll out the unit to their students in the winter term; and (iii) developing short YouTube videos describing any steps or procedures that may be particularly tricky for the teachers to run through with their students; and (iv) build and test engineering prototypes that may be needed for the unit. Several meetings between sub- groups and the rest of the project team will ensure consistency and adherence to the schedule.

Winter term: Pairs of graduate students will then spend a few days in the classroom with the teacher as the units are rolled out. We expect this time commitment to vary depending on the teacher, but we anticipate about 6-8 short (class period length) visits to the classrooms over the project year. Graduate students will not teach the units to the students. That is the responsibility of the teacher. Rather, graduate students will be present in the class to serve as near peer mentors, i. e. meet and chat with the middle school students, perhaps in a Q & A format about the unit, or about what it is like to be a graduate student, how the graduate student may have become interested in science as a career, etc.

Spring term: Be available for classroom visits as above, if a teacher or teachers have not yet begun to teach the units until spring term. And be available to respond to an online questionnaire or an interview request from the project evaluator. Also, be available for one or two community embedded events, such as judging a poster session, helping to staff an outreach booth at a farmer's market, etc. Graduate students will also complete an online questionnaire and/or interview request from the project evaluator at the end of spring term. Overall Time Commitment: This is the third year of the project and based on previous activities our best estimate for the time involved is a day every other week in the fall, an hour or two of class time (i. e. however long each school devotes to science in the daily schedule) for perhaps 2-3 days in the winter or spring, and time for interaction with our evaluator in the spring. We estimate the time commitment to be ~75 hours over three terms. The stipend for the project is \$4,000, plus travel mileage when visiting schools in the winter or spring terms. Please note that the "day or so every other week" is an eight-hour day's worth of time, but it very likely will not occur every other week. For example, some weeks may require two days, and then perhaps none at all for three weeks.

Additional Information: Part of the project will require successful applicants to act as near-peer mentors and to visit at least one classroom at least once over the course of the project year. Each school has different requirements for visitors, but most now require background checks. Sadly, this has become routine for classroom visits in most schools. Any associated fees required for a background check will be paid for by the grant budget; mileage associated with school visits will also be reimbursed. In addition, successful applicants will have to complete the Dartmouth College agreement for working with minors: <https://www.dartmouth.edu/legal/minorspolicy.html> .

Assessment: Dr. V. Lynn Foster-Johnson is the assessment and evaluation professional hired to work on the project team. She will ask you to complete several surveys at different times during the project year, and may wish to interview you about certain aspects of your experience. In addition, you may be asked to provide information/feedback from time to time relative to your experiences throughout the year. For example, this past year graduate students completed a baseline and post-program evaluation survey, and also were asked to complete a mid-project survey/poll.

Benefits:

By participating in this project, graduate students will:

- Improve their communication and creativity skills,
- Gain a more contextualized and nuanced understanding of teaching pedagogy, and
- Improve their ability to explain scientific topics at a number of levels (to each other, to teachers, and to students).

Who May Apply:

Graduate student enrolled in one of the following graduate programs: Chemistry, Computer Science, Earth Sciences, Ecology, Evolution, Ecosystems and Society, Engineering, Experimental and Molecular Medicine, Mathematics, Molecular and Cellular Biology, Physics and Astronomy, Psychological and Brain Sciences, and Quantitative Biomedical Sciences. Due to funding specifications, applicants must be citizens or permanent residents of the United States and have completed either their oral qualifying exam or two years of graduate study by the start of fall term of the 2022-2023 academic year.

Diversity

This SEPA-NIGMS project is committed to a climate that acknowledges and embraces diversity, supports a culture that fosters inclusion, and actively pursues equity. This commitment is driven by a firm belief that welcoming differences of opinion, experience, identity, and perspectives are essential to building a stronger community. Participation in the SEPA project confirms your understanding of this statement and that you agree to abide by these principles.

Deadlines

Application due: Friday, 12 August 2022

Interviews conducted during the summer

Participants identified by late summer

First group meeting in mid to late September.

Questions?

Please feel free to ask:

Roger Sloboda, Biological Sciences, 6rds@dartmouth.edu

Michele Tine, Sociology, Michele.T.Tine@dartmouth.edu

Vicki May, Engineering Sciences, Vicki.V.May@dartmouth.edu

V. Lynn Foster-Johnson, (Geisel) V.Lynn.Foster-Johnson@Dartmouth.edu

You may also contact SEPA graduate mentors from the previous year of the project. Their names and contact information are:

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Finally, please consult the project website for additional details of past activities:

<https://sepa.host.dartmouth.edu/>