



DARTMOUTH SEPA-NIGMS PROJECT INFORMATION

Dartmouth Rural STEM Educator Partnership

2019-2020 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 will partner 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.

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 at Dartmouth. Up to ten graduate students will be involved in the project each year.

Here is a summary of how we currently see the project developing:

Fall term: In early September, graduate students will attend a day-long ideation session with faculty, Montshire Museum education staff, and middle school teachers from the four targeted schools to decide the STEM topic to be addressed for this academic year. The topic would most likely be one in which the middle school science teachers feel they have the least expertise. Then, given the topic, the group will decide what the middle school students need to know and understand to master the topic, at their grade level.

During the remainder of the fall term, the group will meet and brainstorm the details of the procedures, tasks, supplies and equipment required for the students to address the NGSS topic in their classrooms. Although this will occur over several months in the fall, graduate students will not be involved full time. Rather, the group would decide specific components of the project, and then go off in sub-groups to work, at their own pace (but cognizant of time deadlines), on specific aspects of the unit. As examples, these 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; (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.

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 expect about 6-8 short visits.

Spring term: Be available a few times to respond to an on line questionnaire or an interview request from our 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.

Overall Time Commitment: This is the first year of the project, and thus it is difficult for us to project an accurate time commitment. Our best guess for now is a day every other week in the fall, a week or two of class time (i. e. however long each school devotes to science in the daily schedule) in the winter, and perhaps a day for evaluation in the spring; this is ~75 hours over three terms. The stipend for the project is \$4,000, plus travel mileage when visiting schools in the winter term.

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. Applicants must be citizens or permanent residents of the United States and be entering at least their second year of graduate study during the 2019-2020 academic year.



Deadlines

Application due: Monday, 15 July 2019
Interviews conducted during the summer
Participants identified by late summer
First group meeting in September.

Questions?

Please feel free to ask:

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