

Montshire Museum of Science

Annual Progress Report For NCCR Science Education Partnership Award National Institutes of Health

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Introduction

The “Connecting Classrooms and Community with the Health Sciences” SEPA project is a five-year award to provide the development, piloting, and implementation of a series of health curriculum modules and teacher professional development activities aimed at students and teachers in grades 5-8. Specific topics explored in this work are those of high interest in young adolescents and related to current research at Dartmouth Medical School. The programs are targeted at reaching rural youth and their teachers in Vermont and New Hampshire. The project creates a unique collaboration between a science museum, with its rich science education teaching resources and curriculum development expertise with a medical school and its research staff and expertise in adolescent health issues.

A. Specific Aims

The Specific Aims of the project have not been modified from the original proposal and work during the current budget year has been based on meeting those aims.

B. Studies and Results

The second year of the project was productive, meeting the original deliverables of our proposal. We now have 25 teachers involved in the project, representing 9 schools from two states. In addition to activities specified in our proposal for Year 2, we have also added a new project activity which provides middle school students the opportunity to share their research results with others in a new Health Science Research Student Symposium. Specific project activities and results are detailed below.

Health Curriculum Development and Piloting:

A major effort of Year 2 was the evaluation and further refinement of the *Investigations in Diet, Nutrition, and Activity* middle school health science curriculum module. This unit was implemented in eight of our nine project schools during the 2010/2011 school year. The unit includes lessons on caloric energy balance and nutrition, and investigations into food choices, activity levels, diet, and food availability. As part of this particular unit development, we continued our collaboration with Drs. Madeline Dalton and Meghan Longacre of the Hood Center for Children and Families at Dartmouth Medical School.



In addition to refinement of the nutrition curriculum work, Year 2 saw the development and piloting of activities for a new health science module on solar radiation and skin health and protection. Development of this topic involves a formal partnership with Dr. Ardis Olson and Ms. Ceci Gagne, MPH, of the Norris Cotton Cancer Center at Dartmouth-Hitchcock Medical Center. This unit begins with several investigations into the physics of light and the electromagnetic spectrum including a novel hands-on experiment in which students recreate the Ritter Experiment to discover UV light beyond the visible spectrum. Additional investigations have students measuring their own exposure to UV radiation, create a UV-index map of their school yard, and investigate seasonal changes in UV exposure. As in the nutrition curriculum module, the unit culminates with students designing and carrying out their own research in the area of sun exposure. During Year 2 of the project, activities of this unit were piloted in four different schools, in addition to being field tested at the Museum with visitors and during the annual teacher institute.

School Technical Support and Implementation:

Project staff supported eight schools during the implementation of the *Investigations in Diet, Nutrition, and Activity* unit. Support included multiple site visits to each school to work with teachers and students; providing and classroom teaching equipment and materials – including the delivery of a tabletop piece of equipment designed and fabricated by the Museum’s exhibit department which allows students and families to easily make three dimensional graphs representing various health data they collect; and email and phone support with teachers during the program’s implementation in their classrooms. Combined, project staff spent a total of 42 days in schools and classrooms.

Student Research Symposium:

Our project’s logic model is based on the assumption that student understanding of adolescent health issues, and potential for positive behavior changes, will be greater when students are immersed in their own research experiences in the health sciences. Student research experiences will provide them with the opportunities to learn, practice, and develop the skills and processes involved in designing, implementing, and communicating scientific research. They will also immerse the student in the subject matter of their particular chosen research study, leading to great health science comprehension and awareness. Each curriculum module developed as part of this project culminates with a major student-designed research effort.

During Year 2, we provided a way for the students to share their research designs and results with students, teachers, and researchers from outside their own schools and classrooms. The first annual *Health Science Research Student Symposium* was held on May 20, 2011 at the Museum. Fifteen student research groups from four participating project schools presented at this gathering, with three of the four schools travelled 100+ miles to attend, with the fourth school travelling 60 miles. Student research teams each had 10 minutes to introduce their research questions, designs, results and conclusions during three concurrent sessions. Audience members included school faculties, project staff, and researchers from Dartmouth Medical School. This experience proved to be extremely well received by the participating schools and will become an annual event at the Museum for this project.

Researchers Talking About Research Classroom Video:

We began filming a video during Year 2 with the working title *Researchers Talking about Research*. The video highlights different health research from Dartmouth Medical School and Norris Cotton Cancer Center who are partners in our SEPA project. These videos will be used in middle school classrooms to introduce researchers to the students, while discussing the research design process. Each research interviewed in the video will review a different aspect of health science research design and implementation, from developing a researchable question to

communicating your results. The video will be used by teachers during the student research design phase of their health curriculum unit. We anticipate the video to be completed by January 2012, for piloting in classrooms during the spring of 2012.

Community Engagement:

In addition to the curriculum development and middle school classroom focus of our project, *Connecting Classrooms and Community with the Health Sciences* also engages the community through two very different activities at the Museum. The first activity is working with families at the Museum's *Science Discovery Lab* workshop space. We have offered 24 family workshop sessions during Year 2 introducing concepts of energy balance, and portion size. In addition, during the summer of 2011 we are developing and piloting a new family program introducing the new USDA MyPlate, including dietary guidelines and healthy eating recommendations.

Additionally, we've introduced a new after-hours program at the Museum based on the science café model. Dr. Meghan Longacre, one of our project partners, presented her research group's current work in child obesity trends and possible causes on April 27, 2011. This Montshire after-hours program is specifically aimed at the 21-35 year old audience, with over 45 adults attending Dr. Longacre's program. We will continue this new program area and again incorporate our health science research partners into the programming during the 2011/2012 school year.

Teacher Professional Development:

We held our second annual SEPA teacher institute July 5-8, 2011. This institute, *Designing Student Research Experiences in the Health Sciences*, introduced the *Investigations into Nutrition, Diet, and Activity* curriculum module to 9 educators from five schools that will be joining the project as our Cohort 2 teachers. The institute provided teachers the content knowledge and teaching methodology needed to implement the "Investigations in Diet, Nutrition, and Activity" unit in their classrooms during the 2010/2011 school year, including emphasizing the integration of student research experiences into the program. The Institute also included a 1/2 day session led by our Cohort 1 teachers on how they incorporated the nutrition and student research work into their classroom. This allowed for the Cohort 2 teachers to learn from our first year cohort teachers, and provided a chance for our Cohort 1 teachers to take an active leadership role in the project.

There were also two opportunities provided for our Cohort 1 teachers to continue their professional development in the area of teaching health science and integrating it into their science curriculum through a December 9, 2010 seminar day, and during a two-day follow-up teacher institute on July 8 and 9, 2011. 13 of 16 Cohort 1 teachers participated in the December follow-up seminar day, and 12 of the 16 Cohort 1 teachers took time out of their summer vacation to participate in the two-day follow-up teacher institute on July 8-9, 2011.

Evaluation Activities:

Inverness Research Associates evaluators were on-site during the May 19, 2011 student science symposium. At this event they interview students and teachers about how the project has changed their approach to health science education. In addition, during Year 2, Inverness Research Associates have held a variety of interviews with teachers, prepared formative evaluation reports for project staff, and have met with project staff multiple times to help clarify project goals and provide formative assessment.

C. Significance

Based on preliminary data, major lessons which we believe may prove useful to the school health science education field include:

- The role of student research experiences in building awareness of adolescent health issue and providing students greater engagement in health science conceptual learning.
- Providing experienced project teachers with the opportunity to show-case their work to new teachers provides reflective-practice and self-assessment and teacher-leader development opportunities for those teachers presenting their work to their peers.
- Teachers continue to need external expert support in developing and implementing student research programs in their classroom.

D. Plans for Year 3

Early in Year 3, a project website will be developed an on-line that will include project resources, including a downloadable .pdf of the *Investigation in Nutrition, Diet, and Activity* curriculum module. Project staff will also develop a method for teachers to share information and insights in teaching the health sciences with project staff and their peers through this website. The *Researchers Talking About Their Research* video will be completed and piloted in classrooms beginning Spring 2012. Project staff will further refine the module on Skin Health and Solar Radiation and begin developing a new module related to media and adolescent risk behavior.