



**Vermont 2000 Four-Star Outstanding Practice Program Nomination Form**

Partnership Name: Bradford Workforce Investment Board

School(s) Name (s): Newbury Elementary School

Outstanding Practice Nominee

Project Name: NES / CRREL Partnership Program

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Category of Nominated Practice: **Outstanding School/  
Work-Based Practice**

**SCORING**

1	2	3	4	5
<b>Modest</b> Criterion not addressed or evidence not measurable.	<b>Notable</b> Evidence that criterion is addressed, but attempt or outcome merely adequate.	<b>Honorable</b> Genuine effort to address criterion and to provide evidence.	<b>Distinctive</b> Stands out from other practices; relation of practice to criterion is clearly defined, impressive and creative	<b>Superlative</b> Hits the nail on the head, unambiguous relationship to criterion; thoroughness and depth are inspiring

Score: 4.3 on 5 point scale. (See Rubric for detail criteria.)

## **Basic Description**

The NES/CRREL Partnership is a coordinated effort between the classroom teacher Trudy Faden of Newbury Elementary School and Leonard Zablinksi (Zab) of the Cold Regions Research & Engineering Laboratory (CRREL).

The project will take place in the Newbury school, along the Connecticut River at the Huntington Farm. There are many parts of this partnership but the basic STW grant was to work with a team of engineers from CRRBL on their "Ice Action on Riprap" research testing in the Test Basin. The test basin is a large facility at CRREL in which ice is grown and test are made to determine the amount of erosion that can be prevented by installing various amounts and sized of riprap along the bank. Riprap consists of stones, which can be of different sizes and set at different angles to the surface of the river. The size and angle prevent different degrees of erosion, depending on the thickness and strength of the ice that moves along river. In the test basin, there is a platform that can be filled with varying size riprap and set at differing angles and moved along the ice, which is "grown" in the basin.

In addition to this particular task, students were/are involved in making a model of the test basin, collecting data regarding the amount of erosion along the river, checking previous sites where preventative measures have been installed, evaluating the effectiveness of those installations, and learning about ice and the effects it has on the river bank.

Numerous Vermont Standards are addressed in this process which is integrated into the yearly curriculum in science, mathematics, language arts, the arts, problem solving and other aspects of the curriculum.

The following quote from the original application address sustainability and long term benefits: "The STW grant will allow us an opportunity to enhance our ongoing partnership program and connect to local issues by offering more opportunities for hands on experiences: in the classroom, in the field... "outdoor lab" and in the CRREL facility with CRREL Ice Engineer team. Future NESICRREL Partnership projects will continue to offer real life learning opportunities for my students. These learning experiences are beneficial for all students as they use and practice skills that will assist them in becoming informed life long learners."

**1. Describe specifically how the practice includes activities that address one or more of the four areas of Vital Results: Communication, Reasoning and Problem Solving Personal Development, Civic and Social Responsibility**

The NES/CRREL Partnership addresses the communication standards by both verbal and written requirements between the student and business partner and teacher. They must understand and reiterate the instructions given. They are required to write up and present the results of data collected, present test results, promote the projects, call local business and residents to get permission to cross land to reach the test sites, communicate with each other and make final presentations to visitors and evaluators of the projects. During some aspects of the unit the students work as teams and must communicate accordingly. At the conclusion of the project they present to the rest of the class and to visiting parents and administrators as well as the evaluators. Reasoning and problem solving are at the heart of this project. Activities such as gathering data and using it in a logical manner, measuring and evaluating, making sense of the data and what to do once the data is compiled are examples. Personal development and social responsibility are not specific goals but always are part of a long-term unit of instruction, particularly when in conjunction with activities that extend beyond the classroom which they do by working with a local farmer. (see below.)

**2. Describe specifically how the practice includes activities that address the Vermont standards in one or more Fields of Knowledge: Art, Language and Literature History and Social Sciences Science, Mathematics and Technology**

Art by drawing and producing sketches of the land and riverbank, photography recording the activities and producing the graphics and promotional material for the visitors, including the painted logos of CRREL and School-to-Work painted on the classroom windows. Reasoning and problem solving are addressed by having to figure out how to collect the data, how to set up measuring sites, how to measure, move materials about the fields, lay out the study do the charts, representations (drawings), present the results, and numerous other aspects of the task. Science, math and technology are rampant in the plan from measuring, evaluation, data collection, experiments, use of computers, calculating, comparing, reduction of size and building the scale models. Literature is present in reading about other projects and related materials about the river and farm needs, writing reports and creating presentations. Social science is transpires as the students work with members of the community to provide information to one of the local farmers so he can decide what steps to take to protect his land from erosion. Math and science are addressed in numerous ways, measuring, data collection, computation, scaling, lab reports, scientific reports, temperature recording, and recording data.

**3. Describe specifically the activities that connect the academic program to one or more workbased, applied learning or career awareness opportunities.**

The students are involved in many activities both in and outside of the classroom. The class set up and monitored the effects of snow accumulation around a series of shapes for one winter. Measurements and photographs were taken and sketches were made of the patterns around the shapes and that data was actually used to help design and build a large wind tunnel at CRREL. A major task each year is to build a model of the test basin. This model may be made of cardboard of wood and some included a wide variety of materials including Lego blocks and a couple had motors on the rolling platform. This task includes numerous smaller activities such as measuring

studying scaling, visiting the basin, working with angles and ice strength, learning about riprap and visiting sites where riprap has been placed and measuring and determining the various effects of different size riprap.

Students do classroom experiments on various types of natural ice, including; fresh water, snow, salt water, and man made ice that is contaminated with various impurities.

The whole project is an actual effort to save the land from erosion. The information gathered will be used by the farmer to make decisions about how he will address the erosion of his land. These activities connect to several trades as well as engineering and science.

While the students were carrying out these activities they talked to community members, farmers, truck drivers, land use I conservation representatives, state and local government representatives to obtain permits, planners and many others.

All students participate in Ground Hog Job Shadow Day. In addition to various fields of engineering and research the students were made aware of at CRREL, they talked to many people involved in the project about their jobs, the farmers, drivers, chaperones, in addition to their participation in Groundhog Shadow Day.

**4. Describe the planning process for the practice, focusing on the following four elements:**

- *What written learning objectives were established in advance of implementation?*

A series of objectives was compiled. The list is provided in the copy of the original grant, which is attached. Numerous additional ones have been added with input and recommendations from students. Others have been revised as the partnership grows. Some of the are:

1. to learn about river bank erosion, the causes, problems and prevention
2. to make a replica of the river embankment model used in the test basin and calibrate/sort/sieve the riprap stones for platforms
3. to learn about CRREL's riprap model
4. to work with a CRREL team of engineers and other researchers
5. learn about ice and ice formations
6. do experiments using ice using the scientific method
7. plot, discuss and compare current testing data of riprap testing being done at CRREL
8. go on field trips to collect data on ice erosion and snow deposits
9. learn about career choices
10. address the following issues in the science curriculum and: inquiry and experimentation; mathematical understanding; math and problem solving; systems; design and technology; the universe, earth and the environment; and others
11. to address the following Vermont Standards Vital Results: Problem Solving, Personal Development, Communication

- *How did students and teachers collaborate to develop learning objectives?*

In establishing the process for making the model the teacher, engineer and students developed a rubric for the design and evaluation of the completed model. They made a contract that

overcame the hurdles of the task that allowed for all student to achieve a satisfactory completion and for some to excel in the creation of their project. Some could simply accomplish the task and some would be challenged by the effort. The rubric was graded so those who wanted to excel could, and those who wished to be considerably more elaborate could do so. A basic basin was acceptable if it had proper ratios for the real basin's measurements must contain a rolling platform. A higher "score" would be given if it contained extras such as windows, piping etc. The process to develop the learning objectives was, in Zab's words, pretty cut and dry and all levels were achievable.

- *How was feasibility evaluated in advance of implementation?*

The teacher and engineer simply knew what the student's abilities were and the students knew what they could do. They worked together to develop the rubric.

- *What role did students take in design of the practice itself?*

Zab explained that he knew that the students helped design the field studies and measurements. Also, students negotiated with the team to create the rubric, which established the types of scale, and materials that could be used in the building of the model test basin. For example they suggested wood as an alternative, rather than just cardboard. One of the other engineers commented to Zab on the fact that, "The students were tougher on themselves than we were."

## **5. Describe how it is verified that classroom-based programs are academically rigorous and activities are age appropriate.**

The academic program is geared to address many elements of the science curriculum and elements of language arts, math and art. A key component is that they address several of the Vermont Standards and Vital Results. Regular grades are given for projects, homework presentations and class participation. The planning and objectives are based on elements of the school curriculum and the Vermont Standards at grade level.

## **6. Provide evidence of on-going partnership between the participating school(s) and the employer(s).**

The team has now been working together for several years. Each year they improve the classroom presentations and the evaluation system as feedback from students and other professionals participate and react. Both strongly feel that they have grown professionally simply from working together. The teacher is learning the technical material and the engineer is learning teaching skills and how students at that age learn. These two excellent professionals are open to constructive criticism from each other, administrators and the students. They both realize that the other has much to offer and have already become a team that recognizes the value of their partnership. Reports, presentations and evaluations all demonstrate this continuation.

**7. List the applicable federal and state laws and guidelines relevant to the practice, and describe how compliance is assured.**

Students documented the process, initial conditions of bank erosion, which is required for any building permit along the river. This involved finding out what the laws were and obtaining the proper information from the local and state government authorities and documenting the existing conditions. That is a standard practice of the Corp of Engineers.

**8. Describe and give examples of how the practice builds relationships between student and adults.**

The students work with parents and grandparents on field trips, work with the local farmer and engineers from CRREL and other resource individuals. The ongoing relationship between Trudy and Zab brings him into the classroom on many occasions during the year. The students see and get to know him as a professional and teacher, they recognize that he and their teacher work as a team to plan, carry out and evaluate their learning. Having the parents and others on the field trips provides close contact and mutual understanding of their strengths. Other individuals also participate and work with the students, the School-to-Work coordinator, and others who demonstrate, provide information and evaluate their work.

**9. Explain how evaluation is designed into the practice, as evidenced by the following: Continuous or regular evaluation to ensure that educational and learning opportunities and participant performance continue to meet high standards of relevance and quality.**

Each visit by the professionals is prepared for with class and homework assignments prior to the presentation and follow-up activities are given. The students are aware that they are responsible for the information presented. MI visits are prepared for by the classroom teacher. Ongoing evaluation includes homework assessment, class participation, student self assessment, peer group evaluation, outside evaluators of the projects such as the test basin evaluation using the criteria to given the students when the task was assigned.

Individual lesson plans include an evaluation component.

When the test basin model project is assigned each student is given a sheet of criteria for construction the model with choices of the scales that can be used to build the mode. A list of those criteria is provided each student. When completed evaluators use that criteria to evaluate each individual model. Tests and quizzes are graded and every report and presentation is evaluated based on the criteria given the student.

- Outcome-based evaluation tools are used, including peer and self-assessments

As stated above the criteria are presented and made clear prior to the project or assignment. These criteria are based on specifications for the task.

**10. Provide documentation (either evidence or description of method of measurement) that demonstrates that the practice is effective in improving student performance in meeting the Vermont Standards (i.e., provide evidence of success), and that effectiveness is measured by using meaningful, student-centered indicators of success.**

No information provided.

**11. Explain how this practice is capable of continuation and going to scale, and identify specific indicators or measures of sustainability present in this practice.**

This practice is sustainability because the classroom teacher and the CRREL engineer have established an ongoing relationship that is mutually beneficial to both the students and the CRREL research team. Furthermore, the information is and will be used to assist a local farmer in deciding what and how to address the issue of erosion of his land. Both the teacher and engineer have grown professionally from the experience and continue to work as a team to improve the curriculum and the data collecting as well as improve their presentation skills and information base.

**Additional comments:**

While talking with Zab about the project and the application for this 4 Star nomination, Zab pointed out several things. First that one of the other professionals, who worked with him a few times, stated that he wanted very much to work with this teacher. Both have been impressed with Trudy's attitude toward her students; "She has taken a bunch of students and made them believe that, 'Hey I can do this.' It is Trudy who said, 'Take a look.' She opens up their minds and has gotten them excited." Zab added that Burt wanted to pack up and move to Newbury. He had never seen a teacher with so much energy. It is this type of comment that indicates the feeling of the probability of the partnership continues as well as the other more specific information.