New Hampshire NCLB Title II-D
Regular Funds for Round 9
Competitive Grants – February 2011

Step 2: Application Narrative for Classroom Mini-Grants Program

(Please be sure to complete Step 1 online at: www.nheon.org/oet/nclb)

District:	Littleton School District SAU#84	Date:	Feb 27, 2011
Project Manager:	John Peters		
Position Title:	Director of Technology		
Mailing Address:	102 School Street Littleton NH 03561		
Email Address:	jpeters@littletonschools.org		
Phone:	603.444.5215		

BE SURE TO READ ALL OF THE FOLLOWING STATEMENTS.

ASSURANCES

I hereby certify that:

1. To the best of my knowledge, the information contained in this application is correct, and the school board of the district named above has authorized me as its representative to submit this application.
2. The District has submitted to the New Hampshire Department of Education (NHDOE) a General Assurances signature page for the current year.
3. The District has consulted with the appropriate non-public schools during the design and development of this Ed Tech project prior to all decisions that affect the opportunities of private school children to participate in the program.
4. All funding for this project will be obligated and reported no later than the quarterly report ending **6/30/2012** and expended and reported no later than quarterly report ending **9/30/2012.**
5. The grant funds expended will supplement, not supplant, funds from non-federal sources.
6. The District will keep records and provide information to the NHDOE as may be required for program evaluation, consistent with responsibilities under NCLB Title II-D as outlined within the Grant Application Guidance (e.g., annual tech survey, case study report).
7. The schools to be funded by this program are compliant with the Children's Internet Protection Act (CIPA) because the district employs a filtering mechanism for student access or because Ed Tech funds referenced in this application will NOT be used to purchase computers used to access the Internet or pay for direct costs associated with accessing the Internet.

Superintendents: When you submit your final grant application in the online grants management system, you will be certifying the above assurances.

Application Form for Classroom Tech Mini-Grant

Applicant: Littleton School District SAU 84

Criteria	**Applicants**: Criteria used to review each grant application are listed in the left column. Please do not delete the criteria column. By using this right column to describe how your project proposes to meet the criteria, you can increase the likelihood that you won't leave out important information. There is no page limit, but please be as clear and concise as possible.
Project Abstract (10 points) A clear and concise abstract (100-150 word limit) outlines the mini grant project and overall goals, along with the process for implementing it in the classroom.	
1. Describes the project, including grade level(s) and content area(s), indicates how this project fits into school/district curriculum, indicates process for implementation and assessment, as well as how it would advance the achievement of students.	The Littleton High School project is an original project. In this project, we intend to promote student learning by focusing scientific investigation on a local cottage industry, maple syrup production. As this is an interdisciplinary science project, High School students in grades in grades 9 through 12 will be participating
2. Abstract includes an essential question, connected to the state frameworks, which probes for deeper meaning and broader understanding of the framework content addressed by this project, fostering the development of higher order thinking and problem solving.	Littleton High School science students will be answering the following question, "Through scientific analysis what connections and conclusions can be made between environmental conditions and our food supply?" In this project, students in chemistry, environmental science, and biology will utilize laptop computers, probes, spectrometers and GPS equipment, to map, collect, analyze and disseminate data pertinent to the environmental variables that affect the production maple syrup.
Project Description (50 points) Describes project in general terms and indicates whether it is a replicated project or an original project. Projects which can directly impact more than one classroom are preferred. If project is replicated, proposal describes the intended changes to the project idea and how they will improve the project in order to be appropriate for the situation. Includes specific goals and objectives that relate to the essential question, and explains how those goals will be achieved by the project. Include a rationale for any changes made to the original project. If your project is original, proposal describes how the project is appropriate for current situation. Includes specific goals and objectives that relate to the essential question, and explain how those goals will be achieved by the project.	
1. Proposal generally discusses how implementing this project will improve technology integration within classrooms	In this original project, we intend to promote student learning by focusing scientific investigation on a local cottage industry, maple syrup production. Most students in Littleton are aware of syrup production methods and are aware of locally produced product. Maple

and in the core content areas. Indicates the need for technology integration in school or district. Describes the determination of need for this project and includes one or more examples of data that support the rationale of need for the project, such as NECAP assessment or other data. This explains to the reviewer why the project is worthy of funding as it relates to student achievement.	syrup production is highly amenable to inquiry-based investigation because it is, in many ways, akin to wine production (North American Maple Syrup Producers Manual, Bulletin 856). Producing syrup involves tapping individual maple trees to obtain sap. Four distinct species of trees can be used, the sugar maple, the red maple, and the black maple. Sap is only produced for a limited period during the early spring, the length of the season being depends on the weather, with most production occurring when daytime temperatures rise above freezing, but night temperatures are below freezing. The nature of the sap, and the properties of the resulting syrup, varies with the length of the season, average temperatures, soil chemistry, environmental contaminants (such as salt from deicing of nearby roads), local geographic location (slopes, plains), and tree health. The relative importance of these factors is mostly unknown and is the source of local farmer's myths. Students will formulate their own ideas on factors effecting sap production and syrup quality. They will develop their ideas using online blogs, to promote peer discussion over the course of a school year. Although a student may formulate their ideas based on data for a single tree, they will be expected to develop and test their ideas using the data for the entire project, which will be available to them via digital worksheets updated throughout the school year. Each would complete a final reflection and individuals would produce group summaries for the local press and for the local cable channel. Students would also be accessed on individual research tasks. During the project, Littleton students will benefit from access to remote data collection tools from the prototyping company Bug Labs (http://www.buglabs.net). With the "Bug" remote data logging tool, Littleton students will be able to set up a webpage that broadcasts data (including ambient temperature and light levels) and photos from a remote tree sampling site. The protocols for performing this task are built into the device so students can be up and running with very little technical instruction. This is a no cost add-on to the grant as Littleton has obtained this cutting edge toolset as a part of an independent grant that Littleton teacher, Bill Church, is a part of during the spring and summer of 2011. For the past three years, more than 75% of Littleton High School students have test as partially proficient or substantially below proficient in the Grade 11 NECAP Science Test. Although the grant funding is self-contained in a single year, we anticipate that the project will run in successive years. Since virtually all students at Littleton High school take a biology or chemistry class (or both), over a period of a few years the entire student body will have been exposed to the project. By expanding the use of digital tools and adding relevance to the curriculum through this project, we anticipate interest in science will increase, thereby increasing the proficiency levels of our students.
2. Project is focused on one or more content areas, with the proposal indicating which content area and associated standards are the main focus. Proposal indicates how the project will address ICT literacy skills without focusing solely on the acquisition of ICT literacy skills devoid of core content learning.	<u>Content Area Standards Assessed in this project:</u> <u>Science</u> SSPS1:11:3.1 Select and use apparatus and material safely. S:SPS1:11:3.2 Use instruments effectively and accurately for collecting data. S: SPS1:11:4.1 Compile and display data, evidence and information by hand and computer, in a variety of formats, including diagrams, flow charts, tables, graphs and scatter plots. S:SPS1:11:5.1 Explain how data support or refute the hypothesis or prediction. S:SPS1:11:5.2 Provide a statement that addresses and answers the question investigated in light of the evidence generated in the

	investigation. S:SPS1:11:3.3 Compile and organize data, using appropriate units on previous results. S:SPS2:11:1.2 Test how well a theory predicts a phenomena. S:SPS2:11:1.3 Recognize that sometimes scientists can control conditions in order to focus on the effect of a single variable; when that is not possible for practical or ethical reasons, they try to observe as wide a range of natural occurrences as possible to be able to discern patterns. S:SPS2:11:1.4 Show how hypotheses are widely used in science for choosing what data to pay attention to and what additional data to seek, and for guiding the interpretation of the data (both new and previously available). S:SPS2:11:2.1 Realize that systems may be so closely related that there is no way to draw boundaries that separate all parts of one from all parts of the others. S:SPS2:11:2.2 Give examples to show that a system usually has some properties that are different from those of its parts, but appear because of the interaction of those parts. S:SPS2:11:2.3 Demonstrate that even in some very simple systems, it may not always be possible to predict accurately the result of changing some part or connection. S:SPS4:12:3.1 Pursue scientific inquiry such as observation, measurement, hypothesis formation and analysis, and value “habits of mind” such as persistence, accuracy, and collaboration. S:SPS4:12:3.2 Generate solutions to scientific questions and challenges through developing, modeling and revising investigations. S:SPS4:12:3.3 Apply scientific knowledge and skills to make reasoned decisions about the use of science and scientific innovations. S:SPS4:12:4.1 Formulate scientific questions about an issue and define experimental procedures for finding answers. S:SPS4:12:4.2 Plan and conduct practical tests to solve problems or answer a question, collect and analyze data using appropriate instruments and techniques safely and accurately. S:SPS4:12:4.3 Develop models and explanations to fit evidence obtained through investigations. S:SPS4:12:5.2 Use electronic networks to share information. S:SPS4:12:6.1 Create a culminating team project that demonstrates content knowledge and conceptual understanding and shows connections between science content and real-world settings. S:LS1:11:2.3 Recognize how an organism’s organization and complexity accommodate its need for obtaining, transforming, transporting, releasing,

	and eliminating the matter and energy used to sustain it. S:LS1:11:2.4 Explain how the processes of photosynthesis and cellular respiration are interrelated and contribute to biogeochemical cycles. S:LS2:11:1.1 Explain how the amount of life an environment can sustain is restricted by the availability of matter and energy, and the ability of the ecosystem to recycle materials. S:LS2:11:1.3 Identify the factors in an ecosystem that can affect its carrying capacity. S:LS2:11:1.4 Analyze and describe how environmental disturbances, such as climate changes, natural events, human activity and the introduction of invasive species, can affect the flow of energy or matter in an ecosystem. S:LS2:11:3.2 Trace the cycling of matter (e.g., carbon cycle) and the flow of energy in a living system from its source through its transformation in cellular, biochemical processes (e.g., photosynthesis, cellular respiration, fermentation). S:LS5:11:1.1 Describe ways in which technology has increased our understanding of the life sciences. S:LS5:11:1.2 Understand that technology is designed with a particular function in mind, and principles of life science are useful in creating technology for the life sciences. S:LS5:11:2.1 Describe the use and benefits of equipment such as light microscopes, transmission electron microscopes, scanning electron microscopes, spectrophotometers, probes, and robotics to the study of the life sciences S:PS1:11:2.6 Use physical and chemical properties as determined through an investigation to identify a substance. S:PS2:11:1.2 Recognize that atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus; and explain that the outer electrons govern the chemical properties of an element. S:PS2:11:1.3 Explain that compounds are formed through both ionic and covalent bonding. S:PS2:11:1.4 Recognize that the rates of chemical reactions can vary greatly; and identify the factors that influence these reaction rates, such as how often the reacting atoms and molecules encounter one another, the temperature, and the properties of the reacting species, including shape. S:PS2:11:2.1 Explain that chemical reactions either release or consume energy. S:PS2:11:2.4 Identify the variety of structures that may be formed from the bonding of carbon atoms, and describe their roles in various chemical reactions, including those required for life processes. S:PS2:11:3.4 Explain the range of the electromagnetic spectrum as it

	relates to both wavelength and energy; and provide examples of practical applications of the different wavelengths in the spectrum. S:PS2:11:3.7 Explain that waves, such as light, seismic, sound waves, have energy and can transfer energy when they interact with matter. S:PS2:11:3.10 Using information provided about chemical changes, draw conclusions about the energy flow in a given chemical reaction (e.g., exothermic reactions, endothermic reactions). S:PS3:11:2.4 Explain the effects on wavelength and frequency as electromagnetic waves interact with matter (e.g., light diffraction, blue sky). <u>ICT Literacy</u> 1. Creativity and Innovation - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. 2. Communication and Collaboration - Students use digital tools to collect and evaluate data. Through communication and collaboration students will report their findings. 3. Research and Information Fluency - Students utilize digital tools to gather, analyze, evaluate, and disseminate information to support their conclusions. 4. Critical Thinking, Problem Solving, and Decision Making - Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. 5. Digital Citizenship - Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. 6. Technology Operations and Concepts - Students demonstrate a sound understanding of technology concepts, systems, and operations as applied to the conduct of scientific research.
3. Proposal describes in detail the project based learning unit(s) that will encompass the project, and project features support acquisition of digital and media literacy skills. Project based learning (or problem based learning) with a constructivist approach and essential questions are the heart of these projects. Team projects must show evidence that these pedagogies are clearly understood and applied.	Although sap collection only occurs during a limited time window during the school year, the project has been broken into units to allow students to examine seasonal changes that could be dependent factors throughout the school year. During the Fall semester, biology and chemistry students will collect data on: • The location of suitable trees (using GPS and Google maps). • Tree species identification and size description. • Tree environment (type of forest) • Tree health • Soil chemistry • Water chemistry – pH and ion content • Precipitation amounts During the Spring semester, biology and chemistry students will collect data on: • Climate data (low-high temperatures, solar exposure, precipitation). • Amount of sap production per day • Sap properties – temperature, pH, ion content. • Water chemistry – pH and ion content • Microorganism content in sap Also during the spring semester, students will use some of the sap to make syrup. During this process, chemistry students will collect data on:

	• Syrup properties – including color, pH, and ion content. • Sugar content – as determined by amount of evaporation needed to make syrup. • Amount of contaminants. On special focus of this work would be the "color" of the syrup, measured by a spectrometer. Color is commonly used to grade syrup into use categories, ranging from the "light" or "fancy" most often used for use by individuals, to "dark" syrup used mostly for baking or cooking, including many maple-bearing commercial products. Changes in color in the syrup are often observed during the season, but the causes are largely unknown.
4. Proposal identifies and explains at least three specific learning goals the team needs to address in its professional development activities and how the proposed professional development will address these.	Although the team is experienced in many individual aspects of the proposed work, the proposed professional development activities are designed to address technology issues and also solicit input from a wide-range of science teachers. Specifically, the national meeting will allow: 1. Further training in integrating field measurements with the Vernier GPS and Google map applications. 2. Further training in environmental-type laboratory units using both standard portable devices and Vernier probes. 3. Discussion and practice in developing inquiry-based units, including evaluation of the work by recognized master instructors.
5. Proposal indicates that support has been obtained from the superintendent AND the principal, preferably by attaching letters of support within the grant application pages (not as separate files). Such support acknowledges that he/she has read the RFP, understands the requirements, and will allow the applying team to fulfill the requirements, if they are awarded the grant.	Letters of support from the superintendent and the principal are attached. In addition letters of support have been obtained from Councilor Ray Burton's office and the UNH Grafton County Cooperative Extension.
6. Proposal supports schools, teams, or districts that haven't participated in mini-grants previously or partners with such entities.	Littleton High School shares equipment and teacher expertise with other schools throughout the North Country via the North Country Educational Service (NCES). After testing and practice at LHS, the team anticipates expanding the effort to other schools through seminars at NCES. In addition to providing facilities for such seminars, the NCES also loans equipment, including Vernier devices and sensors, to schools to facilitate their science learning goals.
7. Proposal indicates partnerships which involve NH teacher preparation program faculty.	The Littleton High School science department has routinely promoted new teacher development, most recently by interning two teacher candidates in the last three years. Both candidates (one in chemistry, one in physics) were alternative certification applicants and brought significant higher education and military experience into the classroom. One candidate was from Lyndon State (VT), which of course is not a NH facility, but reflects Littleton's geographic closeness to Vermont and its relative isolation from NH teacher preparation schools. The other candidate was from the Upper Valley Educator Institute (UVEI) in Hanover, which focuses on alternative certification. Littleton High School and the science teacher preparation program at Plymouth University have been active partners for the past three years. Plymouth students from the science teaching methods class have observed in Littleton on several occasions and Littleton teacher, Bill Church, has given an annual technology and inquiry in the science classroom presentation during the past three years. Additionally, Bill co-teaches a graduate class, Astrobiology, for science education students in Plymouth's MS and MAT programs. Bill draws upon his experience teaching project based curricula in Littleton for his work in this course. If funded, work done on the project will be used in the partnership between Littleton and Plymouth.

8. Proposal indicates thoughtful inclusion of students with special needs and uses appropriate technology to assist those learners in order to promote the achievement of all students.	Since the project has both laboratory and field elements, it allows students with special needs to contribute on many levels. The process of making maple syrup is in many ways an art, but one that is suited to students with limited mathematical reasoning or literacy deficiencies. Vernier equipment is designed for classroom and field use, and uses an interface that is largely intuitive, so that students with special needs can successfully take measurements of the same quality as other students.
9. Proposal indicates plans for dissemination of the project to other schools and districts throughout the state, including presentations at 2 or more venues.	As noted above, the team intends to use the North Country Education Service (NCES) to disseminate information to other schools in the area, with the intention of bringing other schools into collaboration. Additional presentations at the New Hampshire Science Teachers Association meetings are very likely, which would allow dissemination statewide.
10. Proposal indicates specific plans for video production training as needed and an outline for the promotional video that describes the various stages of design and implementation of the project.	Littleton High school has previously acquired sets of digital video cameras and has built up considerable student skill in video production. The team anticipates the following as part of the project. 1. Video documentation of the project from beginning to end, with students filming individual efforts using the current set of cameras. 2. Compilation and editing of the student films to produce a short promotional video describing the project as a whole. 3. Preparation of a series of short segments presenting the project and its results to the community, via Channel Two, the local community access channel. The school has a long history of presentation of school events on Channel Two.
Capacity for Success (35 points) Describes the capacity of each team member to achieve meaningful success at achieving the goals of the Tech Mini-Grant Program in the school or district. Clearly articulates the program and policies in place that will support success in terms of professional development, technology leadership, and how this program would meet specific achievement needs of the students.	
1. Proposal demonstrates capacity for success by providing strong evidence that school/district and the individual team members are willing and able to conduct the scope of work involved in implementing this project.	As is noted below, all team members are committed to this project as part of their regular classroom content, and this project will be integrated into their effort to better align their curriculum to NECAP standards. All of the content teachers come from a research background, while having practical experience in the specific applications and with the technical tools proposed.
2. Proposal describes why participation in this effort is appropriate for district and the capacity the school or district has that will insure the success of the project.	Participation is appropriate for Littleton due to the experience and training of the teachers, the local knowledge and culture of the students, and the continuing effort by the school to enhance its science education to better meet state goals.
3. Proposal describes any structures, policies, and/or procedures already in place in school or district that support the project and the project-based learning philosophy.	The school district has already contributed resources towards the purchase of portable Vernier units for field-based projects and for use in the laboratory, such that most of the students are comfortable with technology use in the science setting. The district has also put in place resources, including computer servers and communication software that facilitate transmission of information among students and teachers. The school provides a class schedule that allows most of the school's students to participate in the project over the span of two years. The school has spent professional development time on the topic of project-based learning, and the concept is, of course, already heavily engrained in the school's extensive vocational training courses. Project-based learning is also extensively used in senior-level science classes, including robotics and environmental science. The present proposal would take some of that experience and training and move it into the lower-level science classrooms.
4. Proposal discusses the abilities and expertise of the individual team members with respect to their ability to collaborate, organize, schedule, and deliver a successful project to their students.	This project is ideal for the Littleton School district. In addition to having the environment and the community knowledge for the project, the district has staff fully proficient to carry it out. The identified teachers intend to participate in this project from inception. **Dr. Paul Benoit,** Littleton High School's chemistry teacher, has been using Vernier technology in laboratory instruction since 2005. Prior to joining the staff at LHS, he was an associate

	research professor at the University of Arkansas, Fayetteville, and worked on the chemistry of meteorites and lunar samples. He was selected to be an inaugural Amgen teaching fellow with NSTA, spending a year studying inquiry methods and digital learning aids. In addition to tapping his own maple trees, his family in Vermont has been producing commercial maple syrup for nearly a century and a half. **Bill Church**, Littleton High School's physics teacher has been using engineering design challenges and technology toolsets in his physics curriculum since 1997. His work has been supported by the Tufts Center for Engineering Educational Outreach, the New Hampshire Charitable Foundation's Christa McAuliffe Sabbatical program, the Lemelson-MIT program, NH SAU 35 and 84, North Country Educational Services, Antioch New England's COSEED project, and the General Electric ELFUN Foundation. Bill has organized the STOMP program at Littleton High School and it has been an effective vehicle in the past for assisting teachers with the integration of technology in their classrooms. **Vanessa Sandvil.** Littleton High School's biology and environmental science teacher, has been using Vernier technology for laboratory measurements and for field measurements, including stream and water quality monitoring. Prior to joining the staff at LHS, she was an instructor at the Caledonia School in St. Johnsbury, Vermont. She has been involved in maple syrup production with her family in Vermont. In addition to her work in biology, Ms. Sandvil has a strong background in rural and agricultural life, and is an accomplished horsewoman, winning numerous awards including the New England Horseman's Council saddle seat equitation championship in 2004. **John Peters.** Director of Technology, will serve as the project manager for this project. John has served as project manager for all Title IID projects in SAU 84 for the past three years. In addition to being certified as a Mathematics Teacher and Computer Technology Educator, John taught physics at White Mountains Regional High School from 2002 to 2004. He is acutely aware that student interest in the Science, Technology, Engineering and Mathematics (STEM) areas is essential to the future viability of the North Country's economy.
5. Proposal indicates team member and district/administrative support with respect to: • implementing the project in classrooms, • supporting the professional development opportunities necessary to successfully participate in the Mini-Grant program, • participating in required mini-grant meetings, • producing the 3 minute documentary video for presentation, • preparing the lesson plans and materials necessary for sharing with other, • attending the Mini-Grant celebration day, • presenting the project within the district and at a regional or state venue, and • participating in post-project evaluations for program improvement.	As noted above, the team fully expects to implement the project and fulfill the required elements, including project dissemination as outlined. Administration, as noted in the attached letters, also fully supports these efforts. Participation in all required activities has been discussed with all of the participating teachers. They are fully aware of and agree to participate in all of the required activities.

6. Proposal discusses the Extent of Impact within the School – indicates the anticipated number of staff that will be directly and indirectly impacted by the project, as well as the number of students that will be directly and indirectly impacted, along with supporting explanations for each.	The impact of the project, initially, would be confined to the team members and their classes, or roughly one third of the student body of the high school. The number of students impacted would, of course, rise if the project is extended into future years. However, indirectly the project would impact the entire science (three teachers) and math departments (three teachers), and would have impact on the English department (three teachers) due to the emphasis on project communication. Ultimately the project provides a base to practice inquiry skills, which are used on the language, math, and science NECAP tests, which, in turn, impact the entire school.
7. Proposal discusses the Extent of Impact to Other Schools – Describes how the project will involve or include outreach to multiple schools, or multiple districts, in order to increase the impact of the project.	As noted above, the output of the project includes dissemination to other schools in the area, via the school's continuing link with NCES. It also includes dissemination on a state and national level through dissemination at NSTA meetings. Littleton has a formal collaboration with White Mountain Regional high school, through exchange of students for vocational programs, most notably the forestry program run at WMRHS. A portion of this program deals with the maple industry and we anticipate partnering with them after development of experiment protocols.
Budget (5 points) Budget contains a narrative and justification of expenses regarding equipment, supplies, travel, and professional development expenses appropriate to carry out the proposed project. The total for professional development is at least 25% of the total budget requested. Include $100 per team member for each teacher to attend the spring 2012 celebration event.	
Budget is formatted with the narrative in left column and total amounts in right column. Within the narrative, proposal describes a logical connection to district goals and shows how costs were calculated. Proposal includes $100 per teacher for attendance at celebration event.	

In order to accomplish this project, we have identified a number of technology upgrades to our existing facilities. Our department already has four hand-held Vernier Labquests, which are capable of collecting data with a variety of probes. We have temperature, pH, and conductivity probes. We would like to extend these with additional probes to measure contaminants in sap and syrup (nitrates, calcium, and chloride) and a GPS attachment to allow students to record data on individual trees that can be imported onto digital maps. Sap and syrup will be further characterized in the laboratory, including full spectral analysis using a spectrometer attached to a laptop computer. Other laptops will be used to perform ongoing measurements of pH and conductivity during processing, as well as analysis of data and digital publication of results. We also have digital cameras to document student work throughout the project.	**Totals**
Hardware The following items have been identified as digital tools necessary for the implementation of this project	
SpectroVis Plus – computer-aided spectrometer. www.vernier.com	449.00
Chloride ion-specific electrode – www.vernier.com	179.00
Calcium ion-specific electrode – www.vernier.com	179.00
Nitrate ion-specific electrode – www.vernier.com	179.00
2 GPS Sensor – www.vernier.com	142.00
7 Netbook Computers	3500.00
Software We do not anticipate any software purchases. The district already owns licensing for Vernier Equipment software, Microsoft Office Software and Video Editing Software necessary to produce project reports and documentation	0.00

	Materials & Supplies We will need the following supplies to accomplish this project.	
	2 Hot plates – Flinn Scientific – 7” x 7”	472.00
	Maple taps, buckets, and sap transport/storage containers	400.00
	Professional Development The following professional development activities have been identified to support this project.	
	Attendance at the NSA national meeting to demonstrate project	460.00
	- Registration at the Professional Development institute	350.00
	Travel Lodging and Expenses	2900.00
	Attendance an NHDOE Celebration Event	400.00
	Indirect Cost **(per approved 2010-2011 district rates posted at http://www.education.nh.gov/data/documents/indirect10_11.pdf)3.9 %**	390.00
	TOTAL	10000.00

SCHOOL ADMINISTRATIVE UNIT #84
LITTLETON SCHOOL DISTRICT
102 School Street, Littleton, NH 03561
Telephone (603) 444-5215 / Fax (603) 444-3015

Thomas Stephens
Superintendent of Schools

Tom Mangels
Business Administrator

Kelly Noland
Director of Student Services

February 22, 2011

Dr. Cathy Higgins
State Director of Educational Technology
Office of Educational Technology
NH Department of Education
101 Pleasant Street
Concord, NH 03301

Re: 2011 Title IID Mini-Grant Project Submission

Dear Dr. Higgins,

I have read the abstract and the project description of the Title IID Mini-Grant Project submission on the environmental effects on maple syrup production in the North Country. Our NECAP science test scores for the past three indicate that over 75% are below proficient. Last year's test scores show some improvement but our district still has a lot of work to do. By bringing this project to fruition, I believe we can stimulate interest and bring relevance to science to our students. I also firmly believe that successful execution of this project will enhance and increase the learning experience of Littleton High School science students which in turn will be reflected in increased performance on future 11th grade NECAP science tests.

Since I have been in New Hampshire, I have become aware of just how important the maple sugar industry is to this region. Not only is it a locally produced product but it is also a source of identity and pride to the people of Grafton and Coos Counties. Therefore, I wholeheartedly endorse and support the efforts of the district's science teachers and technology director in this outstanding project.

Sincerely,

Thomas L. Stephens
Superintendent

ALAN D. SMITH
Principal

LINDA L. LEAVITT
Assistant Principal

JOSEPH SHEA
Guidance

HUGH J. GALLEN REGIONAL
CAREER & TECHNICAL CENTER

DR. GWEN BLAIR
Career & Technical Director

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Mr. Tommy Stephens, Superintendent
Littleton School District SAU #84
102 School Street
Littleton, NH 03561

Re: 2011 Title IID Mini-Grant Project Submission

Dear Mr. Stephens:

I am writing this letter in support of the Title IID Mini-Grant Project which is being proposed by the Littleton High School Science Department. Funding for this project will enable our students to examine scientific data pertinent to the environmental variables that effect the production of maple syrup.

The maple syrup industry represents an important component of New England's character and economy. Each year the New Hampshire maple industry produces close to 90,000 gallons of maple syrup. In Vermont, the highest volume maple syrup producing state in the region, the multiplier affect of the industry to related equipment, manufacturing, packaging, and retail sectors equals $105 million annually and represents approximately 4,000 seasonal jobs. The maple syrup industry also contributes significantly to the tourism industry and other service sections within the North Country region.

The successful maple syrup season depends on the proper combination of freezing nights and warm daytime temperatures. Health issues relating to the maple trees, along with a number of different pests and pathogens and acid rain and soil depletion are areas of concern. If Littleton High School receives this mini-grant these and other important environmental issues will be examined closely by the students in our chemistry, biology, and physics classes.

I believe this project will enhance the Littleton School District by promoting active environmental studies, which will improve our student's educational experiences. This will enable the students to foster an environmental understanding and appreciation for the maple syrup industry as an important part of the New England character, way-of-life, and economy.

I am, therefore, highly in favor of this exceptional and worthwhile project.

Sincerely,

Alan D. Smith
Principal

ADS:nlr

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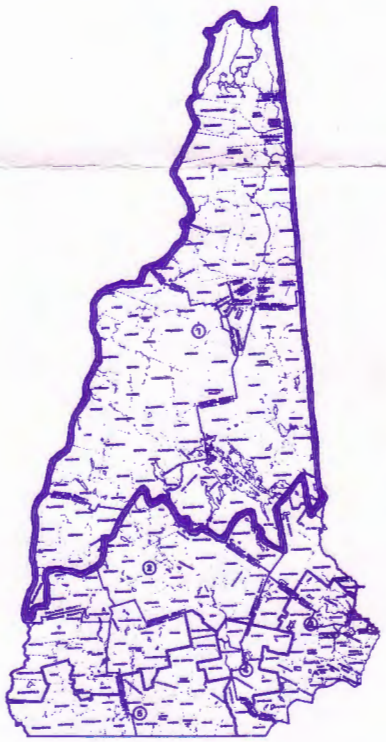
Executive Councilor
District One

February 18, 2011



Superintendent
Littleton School District SAU#84
102 School Street
Littleton, NH 03561

RE: 2011 Title IID Mini-Grant Project Submission

Dear Mr. Stephens,

I have read the abstract and the project description of the Title IID Mini-Grant Project Submission on the environmental effects on maple syrup production in the North Country. I wholeheartedly endorse and support the Title II D Grant Proposed Project by the Littleton High School science teachers. This project is an excellent vehicle for bringing real world application of scientific concepts with relevancy to global influences on locally produced products. Projects like these raise the awareness of our students on just how precious and unique our lifestyle is and how vulnerable our local environment is to global environmental change.

Good luck to you in your quest for this grant opportunity and thank you for the opportunity to lend my support for this outstanding and worthwhile project.

Yours truly,

Raymond Burton
Executive Councilor

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Cooperative Extension

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749-4445

Sullivan County
863-9200

February 18, 2011

Thomas L. Stephens
Superintendent of Schools, SAU 84
102 School St
Littleton, NH 03561

Dear Mr. Stephens,

I recently reviewed the project grant proposal from John Peters, Director of Technology at Littleton High School. The title of the project is "North Country Learning through Inquiry: Science through Maple Syrup".

I found the project proposal to be an exceptionally creative idea. This is a great way to integrate the curriculums of biology, chemistry and natural resource science into a real world project that gets kids out of the classroom and involves them in the study of an industry that has very local significance.

The forest products industry is New Hampshire's third largest industry with tourism being, without a doubt, number one. The impact that these two industries have on our North Country economy cannot be underestimated. The production of maple syrup crosses the boundaries of both forest products and tourism. It is a natural indigenous forest product that people travel many miles to observe the production of and purchase the final product, right here in our backyard.

This project will address elements of forty-two New Hampshire academic standards. This fact alone will give it great significance in the study of biology, chemistry, technology and natural resource science within the curriculum of Littleton High School. I also believe that this project will give students the opportunity to study the forest products and tourism industries, thus relating the impacts that these industries have on the North Country economy.

It is with un-biased enthusiasm and strong scientific knowledge of New Hampshire's forest products industry that I whole heartedly endorse this project. The office of the Grafton County UNH Cooperative Extension is at your service. If there is anything I can do to help see this project through, please do not hesitate to contact me.

Sincerely,

David Falkenham
Extension Educator, Forest Resources
UNH Cooperative Extension, Grafton County

UNIVERSITY of NEW HAMPSHIRE
Cooperative Extension

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Thomas L. Stephens
Superintendent of Schools
Littleton School District SAU#84
102 School Street
Littleton NH, 03561

Monday, February 28, 2011

Dear Mr. Stephens;

Recently I learned of Mr. John Peters' proposal to teach science through maple syrup production. Not only is this a complex scientific process worthy of study, it is also an enjoyable project where children will have the experience of sampling the fruits of their labor! It is with pleasure that I offer my recommendation in support of Mr. Peter's proposal! I also hope this project will encourage other teachers to explore opportunities that approach education through real world applications.

In my personal experience, science and math did not come alive for me until a teacher was willing to show me application. I immediately went from a C student to an A student and was excited about learning more. Teaching kids to memorize a recipe of facts does not instill passion in the way that teaching kids how to cook does. Albert Einstein said; Imagination is more important than knowledge! Giving kids tools that they can imagine uses for, will encourage creativity and excitement.

Some of the scientific concepts that maple syrup production brings to mind include:

- Reverse osmosis
- Energy Units (BTUs) and comparison by fuel source
- Solvents, Solutes & concentrations
- Variation in Boiling points
- Surfactants
- Forestry
- Silviculture to maximize sugar production
- Photosynthesis
- Tree Measurements & Trigonometry

and many more that Mr. Peters includes in his proposal.

Congratulations for bringing a spirit of creativity into the classroom! If there is any way I can assist with this or other projects, please do not hesitate to call.

Sincerely,

Brendan Prusik
Natural Resources Educator.