NEF Grant Application Form

Check box for current grant application cycle: *
[x] Fall
[ ] Spring

Project Name: Interactive Weather Station
Primary Contact: Krissy Fernandes
Email Address: kfernandes@benhempto.org
Telephone Number: 781-789-8621
List Team(s) and Teachers/Specialists participating.
Linda Aber (Parent & PTO Board Member, Bennett-Hemenway)
Krissy Fernandes (Parent & PTO Committee Chair, Bennett-Hemenway)
Ian Kelly (Principal, Bennett-Hemenway)
Heather Smith (Principal, Lilja)
Matt Joseph (Principal, Memorial)
Karen Ghilani (Principal, Johnson)
Kirk Downing (Principal, Brown)
Teresa Carney (Principal, Wilson)
Kim Marzullo (1st Grade Teacher, Bennett-Hemenway)
Julie McVicker (1st Grade Teacher, Bennett-Hemenway)

1. What school(s) benefit from this proposal? *
(Check all that apply.)
[x] Natick Preschool
[x] Bennett-Hemenway Elementary
[x] Brown Elementary
[x] Johnson Elementary
[x] Lilja Elementary
[x] Memorial Elementary
[x] Kennedy Middle
[x] Wilson Middle
[ ] Natick High
[x] Other: While the system would be installed at Bennett-Hemenway Elementary, all schools would have access to the educational tools and data collected by it. The Natick community as a whole can also benefit from this system.

2. What grade levels benefit from this proposed program? *
(Check all that apply.)
[x] Preschool
[x] Kindergarten
[x] Grade 1

[x] Grade 2
[x] Grade 3
[x] Grade 4
[x] Grade 5
[ ] Grade 6
[ ] Grade 7
[ ] Grade 8
[ ] Grade 9
[ ] Grade 10
[ ] Grade 11
[ ] Grade 12
[x] After School Program
[x] Other: While the educational tools will focus on the K-5 curriculum, the data collected would benefit all grades.

3. Total number of students to benefit: Over 620 at Ben-Hem alone. Over 2,600 across Natick in the K-5 range. Over 5,500 across all Natick Public Schools. (Numbers based on enrollment numbers from 2013 that were the latest available on the Natick Public Schools website. These numbers are likely larger today.)

4. Total amount of funds requested from NEF: $8,990

5. Can you run this program on partial funds?
If you answer no, please skip down to question 6.
[ ] Yes.
[x] No.

5a. If yes, what is that partial amount?

5b. If yes, explain how you would run this program on partial funds, and what benefit you would have if granted the full amount.

6. Are you seeking funds from sources other than NEF? *
If you answer no, please skip down to question 7.
[ ] Yes.
[ ] No.
[x] Other: We do not have an alternate source for funds at this time. Depending upon the outcome of the NEF grant, we could pursue supplemental funding from local businesses. One potential avenue would be WBZ as they have a partnership with WeatherBug.

6b. If yes, name other sources, and amount you are requesting from them.
N/A

6c. If yes, explain how receiving or not receiving funds from other sources will affect this program's implementation.
N/A

6d. If yes, tell us the total amount of funding required from all sources (NEF plus other sources).
This should be the summation of funds from question 4 and 6b.
N/A

7. Date this proposal was submitted to the appropriate principal: *
All grant proposals must also be submitted to building principal.
September 28, 2015

8. Have you been awarded grant funds through NEF for any past projects? *
[x] Yes.
[ ] No.
[ ] Other:

8a. Have you submitted feedback to NEF for all of your past projects? *
NEF requires you to submit feedback on projects funded by NEF within 6 months. Whether or not you have submitted feedback on past projects will impact your consideration in this and future grant proposals. Please submit all feedback ASAP.
[x] Yes
[ ] No
[ ] Other:

Project Description:

Please review the NEF Grant Proposal Evaluation Criteria (at bottom of application) for a detailed description of the criteria for selection to help you write your proposal.

I. Clearly state the project's goal, objectives, and what you are going to do (method): *
The goal of this project is to enhance math, science, geography, and technology education for Natick students by joining the WeatherBug Schools Program.

The WeatherBug Schools program includes a commercial grade weather system as well as educational software that would help teachers to easily incorporate the data collected into the existing curriculum. The teachers participating in this grant request, Mrs. Marzullo and Mrs. McVicker, feel as though the WeatherBug Schools Program will make

the weather topics in the curriculum more real and exciting for students in addition to providing a topic of interest for lessons across all areas of the Core curriculum.

Classes will be able to view and analyze data from Bennett-Hemenway and compare it to other weather stations around the world including a pre-existing station located at Kennedy Middle School in Natick. The WeatherBug Schools program would also allow students to view time-lapse and video footage from schools and other weather stations around the globe. These features are not only really cool, but they give teachers real-world and real-time information to make their lessons more engaging and dynamic.

Because the WeatherBug Schools Program has an easy to use web interface, the objective of putting this system in place would be fully integrate the use of it into the Natick K-5 classrooms. Teachers that discuss the weather as part of morning meetings can pull up the Bennett-Hemenway weather page. The Natick schools and PTO's can link to the Bennett-Hemenway weather page on their websites. The Bennett-Hemenway data can be used for comparing climate differences across town, the state, the country and the world. There are endless applications for how to utilize WeatherBug.

The implementation plan of the WeatherBug Schools system would include:

* Installation of the hardware
* Professional development for teachers who will be using the program in their classrooms.

Installation of the WeatherBug weather station and components would be provided by WeatherBug contractors. WeatherBug's technical support team will test the system through remote communications to ensure that the system has been properly installed, calibrated and is fully operational. Following installation, technical support would monitor the system around the clock.

Professional Development will be of critical importance in achieving maximum use and only benefits the teachers and students that will use the WeatherBug Schools Program in the classroom. WeatherBug has significant experience in the development, coordination and execution of teacher training workshops. The training sessions will include: (1) system and software demonstration, (2) hands-on software training, and (3) curriculum applications and classroom implementation. The training session are held on the school site.

Based on WeatherBug's experience with school installations and successful use, the timeline of training and programs that they recommend (after system installation) are as follows:

Week 1: Lead Teacher Content and AYC Training

• The first week is a great time to log on and get to know WeatherBug Achieve and all the new features.

• Achieve has added special content just for Lead Teachers to help them become the school expert on the product.

• AYC Training sessions, pre-recorded training, can be viewed at teachers' convenience. They are in the "Support" section of WeatherBug Achieve.

Week 2: Get the Word Out!

The more we get the word out, the more successful the WeatherBug Schools Program will be! There is a Word document version of a press release template included in the Lead Teacher Kit. It can be customized with school information and can be included in as many communication vehicles as possible: local newspapers, morning announcements, school newsletters, PTA/PTO correspondence and of course the school and company sponsor websites!

Week 3: Professional Development for All Teachers

WeatherBug will host a hands-on, minds-on learning session for teachers at our school. Training will include:

• An overview of the program.

• Explanation of all features.

• Materials - "WeatherBug Achieve at Your Fingertips" User Manuals

Week 4: Start the Meteorologist of the Day Program

The Meteorologist of the Day program was designed to get teachers and students involved with WeatherBug Achieve right away. Soon, students will become weather experts giving daily forecasts for the school and teaching and learning every day.

Weeks 5-6: Follow-up Training

Now is the time to follow up with registered teachers, go over any AYC training sessions they have not seen and review the program answering any questions.

Because the WeatherBug station can be used by all schools in Natick, we will try to identify a "WeatherBug Expert" in each school that can attend the onsite training and help to answer any questions that the teachers at their school may have as they start to integrate the system into their curriculum.

In addition to Professional Development, WeatherBug will develop and maintain a school weather web page that will feature "live" data from the site and can be linked to all school and community websites (including NEF's new website).

II. Relate the project to the current curriculum and describe how this will enhance or enrich the students' learning experience. *

We all relate to the weather on a daily basis. Students, in particular, take a keen interest in it. The WeatherBug Program uses the universally engaging topic of weather as a "window" to interdisciplinary curriculum in core content areas.

The WeatherBug weather station records 27 weather parameters including outdoor temperature, relative humidity, wind speed and direction, barometric pressure, rainfall and light intensity. The interactive web-based software allows students to access real-time, up-to-the-second weather information from any participating school. The data is then displayed in a number of formats, including color graphical displays, images, maps and line graphs (See Figure 1). The comprehensive K-12 teacher-developed and classroom-tested lessons, activities, tools and features are found in WeatherBug Achieve, and online education software tool, which can be integrated into the existing school curriculum with ease.
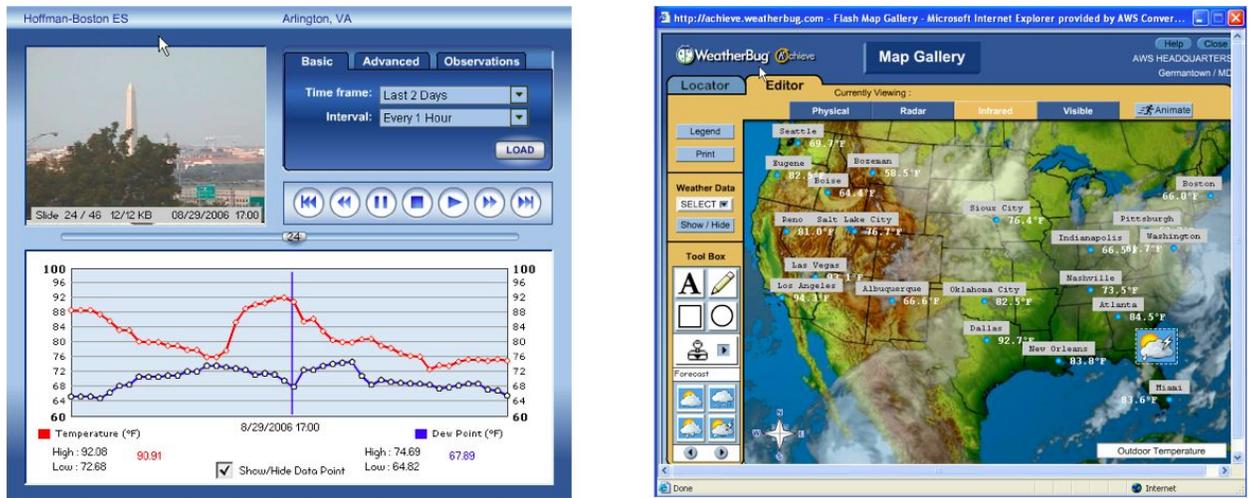

Figure 1

The system and network have been specifically designed for education and present numerous opportunities for interdisciplinary studies. The system fits naturally into science, math, geography, and technology curricula, and includes problem solving, statistics, graphing, data analysis and interpretation applications, just to mention a few. Beyond science math, geography and technology, the school can integrate the weather station and network into daily morning announcements, writing exercises, and social studies lessons. For example, students can research the effects of weather history, business or the economy. They can also study the impact of local weather conditions on the school's energy consumption.

The WeatherBug Program also provides excellent opportunities for students to analyze and interpret real world data. Students learn to appreciate environmental awareness through monitoring of meteorological parameters that are critical to our environment. Overall, the WeatherBug Schools Program becomes an information resource that is available for use in all classrooms for all students at all times.

One of the most innovative aspects of the WeatherBug Schools Program is the ability to integrate "live" data into school website pages. Not only can schools share real-time weather data with other participating schools, but also the school weather stations become a community resource. Students, teachers, parents and the community can retrieve live neighborhood weather conditions via the school's Internet home page, on smartphones and in the WeatherBug application and websites. (See in Figure 2.)

Figure 2 - Real-time WeatherBug Data on the Internet and Smartphones

Looking at the Massachusetts Curriculum Frameworks, many standards have been identified as having the ability to be directly and immediately enhanced by the WeatherBug Schools Program (see attached Standards documents). In addition, the proposed changes to the Science and Technology/Engineering framework for next year would place a large emphasis on weather and natural disasters that would fit well with the proposed WeatherBug system. There are other ways that the WeatherBug system can be used to enhance English and Language Arts standards that are not covered as part of this analysis.

Another innovative component of the WeatherBug Program is the participation by television broadcasters. Meteorologists from a television station in each area participate in the WeatherBug Program by routinely integrating data and high-definition imagery generated from local schools into the news weathercast by airing live, real-time weather conditions from neighborhood locations, like Bennett-Hemenway Elementary School. The broadcast exposure increases the interest and enthusiasm of students, teachers, parents and the community at large.
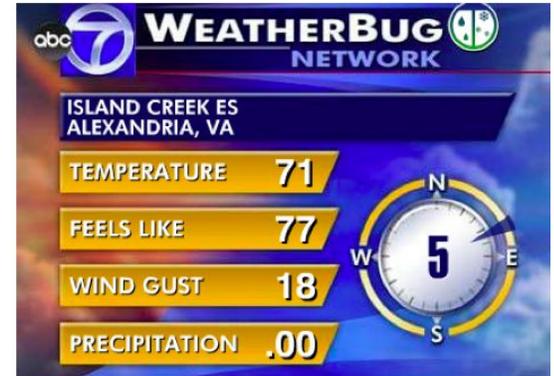
Figure 3 - Real-time weather display as seen on TV

The benefits of the WeatherBug Schools Program extend beyond the classroom. Weather impacts people's lives on a daily basis, and the school's WeatherBug Program will serve as the source for real-time local weather information for local TV.

In most situations large regional airports are the only public source of weather information. However, most people do not live in close proximity to the airport and often find that the airport conditions are not representative of weather conditions in their neighborhood. Accessible via the Internet and TV, the WeatherBug Schools Program is a reliable source for real-time, local weather conditions.

III. Describe how you will assess the project's success. *
(NEF requires updates on the project within 6 months of implementation, and at the completion of the project.)

We will assess WeatherBug Schools success in several ways. The first is to measure the adoption of the WeatherBug application. WeatherBug is able to provide data on how many user logins are created for the Bennett-Hemenway Weather System.
We would like to see the number of logins created increase month-to-month over the first year. In addition, since our goal is to have the system used by all Natick Elementary Schools, we would like to ensure that there is at least one "expert" trained at each one.
(Metrics: Number of WeatherBug Users, Number of Schools Trained)

The second way that we will measure success is through teacher and administrator feedback. We have already established the process of surveying teachers through the existing Seed to Harvest program and will extend this to the WeatherBug Schools system as well. The feedback that we will be requesting is a satisfaction rating on several areas of the program including usability of the tool, lesson planning resources provided, and ease of use. To ensure that we have the needed data to update NEF on the project, we will initially send the survey to teachers every 3 months. **(Metrics: Satisfaction Ratings)**

We will also be asking for specific examples of the lessons and activities that they utilize the WeatherBug Schools system for and suggestions for improvement. This information will be made available to all Bennett-Hemenway teachers and administrators so that ideas can be shared and we can move the program forward over time. **(Metrics: Use Cases and Suggestions for Improvement)**

IV. Itemize the proposed project's expenses and describe additional resources that might be required, if any. *

We are requesting to purchase the WeatherBug Standard Package which is a one-time cost of $8,990. This includes a WeatherBug Weather Station (to be installed at Bennett-Hemenway Elementary School), a WeatherBug Network Appliance, installation services including all necessary cabling and connections, a lifetime site-license to WeatherBug Achieve (educational tools), and interactive tools and activities (LCD Display Unit, Safety Alerting Tool, and Online Weather Center). There are no recurring service or software costs. There is a one-year warranty on the Weather Station. After this point, any required maintenance would cost extra. The WeatherBug Weather Station is commercial grade and does not require any regular maintenance. In speaking with WeatherBug, we found that the system installed at Kennedy Middle School (which is still reporting data to the network) has been installed for 20 years with no maintenance required.

There are additional tools that can be added onto the WeatherBug Standard Package including a stationary HD Camera, a mechanical HD Camera, and a Lightning Detection System. These systems can cost an additional $7,000-$20,000. While the cameras would add an extra level of education for students, with the time-lapse photos, we felt that the initial return on the investment was not as great. It will take some time to get teachers to integrate the Basic Package into their lesson plans before they would be able to take advantage of these extra features. Especially at the Elementary level, we feel the greatest value comes from the Basic Package.

While installation is included, Bennett-Hemenway will need to ensure that there is an ethernet and power connection for the system to utilize. In speaking with Mr. Kelly, this would not add a significant cost and can be covered by the school budget if needed.

If there anything else you would like to add to this grant proposal, but couldn't find an appropriate spot for it, please tell us below.

The WeatherBug Schools system is a great opportunity to enhance the Core curriculum for ALL Natick students. While this grant proposal focuses on the use at the K-5 level, the system can be used by all grade levels. It is unique in that it also can be used at the community level.

Since none of the parents and teachers involved in this grant request are weather experts, we reached out to one of our parents, Cindy Fitzgibbon (Gobeille) to get her

advice. Cindy is a meteorologist for WCVB StormTeam 5. She appears weekdays on NewsCenter 5 EyeOpener from 4:30 a.m. - 7:00 a.m. Cindy had this to say about the WeatherBug Schools Program.

"The WeatherBug network is quite good- both as a weather resource and a teaching tool for the kids. There is a broadcast component with the company that allow them to share observations with TV stations as well. I think WeatherBug is an excellent choice and will be a valuable asset to the Ben-Hem community."

WeatherBug has a wealth of documentation and information on their website. Attached are a few documents that summarize the WeatherBug Schools offering and the Weather Station.

From a technology perspective, we have asked many qualifying questions of WeatherBug to ensure a smooth installation and to ensure that there will be no added costs. One of the really great features of WeatherBugs web application is that there is no additional recurring cost for each user login that is created. A lot of Software as a Service companies will try to increase their revenue by charging an annual fee for every login created. This is not the case with WeatherBug. Bennett-Hemenway will be given a Site ID, then teachers can use this ID to create as many logins as they need.

Other questions that were asked are:

What are the technical requirements of the WeatherBug Weather Station including where should the weather station be installed?
The installation guides can be found online at: http://download.aws.com/

What power resources are needed (is it solar or is a plug required)?
A power outlet is required.

What internet connections are needed (which ports are needed? Does the system communicate wirelessly or is a physical ethernet connection required?
A physical ethernet connection is required. Port 80 & Port 9500 UDP outbound must be open to allow live weather data to transmit to the WeatherBug network.

Which IP addresses/urls does the system need to communicate with (to ensure access through firewalls)?
The www.aws.com and www.weatherbug.com URLs will have to be whitelisted. Mr. Kelly said that this can be taken care of through the town IT department.

What is the lead time to get a system installed?
Depending on when a grant decision is made and when funds are made available, it is possible that the system could be purchased and installed this calendar year. If the

purchasing process happens too close to the winter months, installation may have to wait until the spring.

Is it better to get the WeatherBug hardware or purchase a system that is compatible with WeatherBug (i.e. http://www.ambientweather.com/am6163airbridgekit.html)? Why?
There are backyard weather stations that can be purchased for around $1,000-$1,500. Some of these weather stations boast WiFi connectivity as well as being WeatherBug compatible. WeatherBug's weather station commercial grade and based on their experience, WiFi connections are not reliable and cause interruptions in the collection of data at weather stations. In addition, the network that these systems are compatible with are not WeatherBugs core network (which is used by the WeatherBug Schools program). They report their data to a historic Backyard network. This network would not provide nearly as much value to our schools since it does not include the teaching resources.

Are there other WeatherBug Schools systems in Massachusetts?
Yes, there are many schools in Massachusetts on the WeatherBug Schools Program. We found that Kennedy Middle school even has a system that was installed in 1995 and is still reporting data to WeatherBug. Their system is older and does not include the WeatherBug Schools educational tools. It can be accessed from the tools, however, if Bennett-Hemenway is able to go forward with the program. This opens up an opportunity to make comparisons in weather parameters across town since Bennett-Hemenway and Kennedy are geographically situated on opposite ends of Natick.

How much historical data is stored on the WeatherBug network?
120 days of data is stored, however an API and data stream is available so that data can be stored locally for a longer period of time (i.e. year over year).

NEF Grant Proposal Evaluation Criteria

Total possible: 105 points.

I. Basic Standards: 50 points, all or nothing.

A successful proposal meets or exceeds all the following standards:

•   The project must align with and enhance the curriculum.
•   The proposed project's goal, objectives, and methods must be clearly stated and feasible.
•   The proposed budget must be clearly justified and realistic for the project's objectives.

•   If you are applying for additional funding from other sources, you need to include plans for securing that funding (funding sources and dollar amounts).
•   NEF must be the most likely and logical funding source for project (please visit www.natickedfoundation.org for information about NEF's mission and scope of funding). Any health-related proposals should be directed to the MetroWest Community Healthcare Foundation (www.mchcf.org).

II. Written Presentation: up to 10 points.
A well-executed written presentation expresses competence and enthusiasm on the part of the applicants. Application should be clear and complete; goal, methods, and plan to evaluate the success and impact of the project should be logical, plausible, and well explained.

III. Potential benefit: up to 30 points.
•   The number of students directly impacted should be commensurate with the project's budget.
•   The most successful proposals are those that demonstrate the potential to impact students, educators, and the community beyond its initial scope.
•   Extra consideration will be given to proposals that include a plan for the re-use of materials or equipment purchased within the grant.

IV. Merit: up to 10 points.
The most successful proposals are those that enrich and enhance the curriculum while demonstrating creativity, innovation, and originality.

V.   Extra Credit: up to 5 points.
Proposals that include a feasible plan for establishing a secondary pool of beneficiaries (e.g., a plan to educate other teachers about learning made possible by purchase; to bring the benefits to other schools, teachers, or the broader community; and to lend or share material, as appropriate) will receive extra credit.