

B. GOALS. *List your project goal(s) as identified in your grant application.*

The goal of our project was to increase exposure to simple ways for teachers and students to actively make progress towards a more sustainable agriculture by growing your own food and improving soil health. We hoped to teach 30 lessons and reach up to 200 children from early childhood to high school age. We made progress towards this goal by (1) encouraging active engagement of participating teachers in the learning process with a weeklong professional development program support, (2) providing learning experiences through lessons that are easily aligned to goals with simple materials accessible to classroom teachers and afterschool programs, and (3) offering support through visits to classrooms and encouraging visitors to our educational Urban Farm and partner school gardens.

C. PROCESS. *Describe the steps involved in conducting the project and the logic behind the choices you made. Why did you use this approach? Please be specific so that other educators can consider what would apply to their efforts and gain from your experiences.*

In order to facilitate this youth education program, we relied heavily upon the continued growth in the capacity of our organization and the relationships within the community. Instead of focusing on reaching the maximum number of teachers/classrooms possible, we worked hard to build strong relationships and ongoing support for our partnering schools and afterschool programs. These long-term relationships help ensure the enduring practices of classroom teachers as well as built a strong reputation of our educational non-profit organization. With the help of this grant funding and our increased capacity, the Columbia Center for Urban Agriculture has become known in the community as an asset for teachers and educational organizations seeking meaningful learning experiences related to the food system.

The planning for implementing this grant was embedded in our organization's strategic planning the education department's priorities and capabilities. In the first year of the project, there was energy exerted to expose future classroom teachers to our lessons through our professional development program. Initially, we intended that this approach would meet all of our project goals, but we eventually relied upon our close relationships with local elementary schools, pre-schools, and out of school programs. During the second year of the project, the CCUA was exerting more energy into building our Urban Farm as an experiential learning destination, and we continued to expose children to the similar lessons that were adapted to experiences in gardens. This meant that during field trips parents and teachers could be certain that their children were meeting the age appropriate learning goals. Through some exploratory research, we found that some teachers are excited about teaching science in particular through food and agriculture, but lack the pedagogical knowledge, confidence, or time to move outside of pre-determined district curricula. However, we found that being able to speak a common language with educators related to learning goals, outcomes, and meaningful assessments, allowed teachers to see that straight forward lessons on seeds, sprouts, and worms can meet rigorous learning expectations aligned with state standards. That being said, we maintained some level of flexibility with teachers in order to craft a learning experience catered to their classroom needs. For example, during a lesson in a 5th grade class, we were able to adjust a lesson on worms to focus on learning goals aligned with ecosystems. Instead of the more traditional route of focusing on the worms, we treated the worm bins as a model ecosystem that included abiotic

and biotic factors, which must be in balance to support the dynamic interaction of microbes, macro-invertebrates, and worms.

D. PEOPLE. *List people who assisted with the project and explain how they were involved. Please include educators, farmers and ranchers, parents or others who may have helped you. Also, list any personnel from a public agency, such as the Extension Service, Natural Resources Conservation Services or Soil and Water Conservation Districts who may have assisted with this project.*

Over the past two years, there were numerous people who assisted with this project from a number of different organizations:

1. Dedicated interns
 - a. Andrea Stone, Natalie Freeman, Luke Freeman
2. Consulting MU professors from the College of Agriculture Food and Natural Resources
 - a. Dr. Randall Miles, Dr. Jan Weaver
3. Consulting MU professors from the MU Science Education Center
 - a. Dr. Deborah Hanuscin
4. Consulting Educators from the MU Office of Science Outreach
 - a. Chris Murakami, Dr. Deanna Lankford, Dr. Anna Waldron, Parker Stuart
5. Full-time CCUA staff
 - a. Billy Polansky, Caroline Hargrove, Daniel Soetaert, Adam Saunders, Heather Gillich
6. CCUA Americorps Vista Members
 - a. Heather Gillich and Natalie Suntrup
7. Participating teachers and support staff
 - a. John Nies, Monica Poindexter, Susan Garton, Pamela Storey, Ariel Robinson, Andrea Lickteig, RJ Welter, Kelsey Lees, and Heather Myers.

E. RESULTS. *What results did you achieve and how were they measured? Sustainable agriculture is farming and ranching that is ecologically sound, profitable, and socially responsible. Which of these aspects of sustainable agriculture did the youth you were teaching learn about? Describe the youth audience you were trying to reach. Include outcomes you achieved and how you measured them through surveys, attendance, or other methods (if appropriate).*

We set the goal of reaching 200 students and 10 different classrooms for our project. By the end of 2011, we had reached over 280 students with 14 different classroom visits. Up to now, only accounting for our lessons on seeds, sprouting, and worm composting, we have added an additional 98 students and 3 new programs. Since our outcomes were primarily focused on exposure through learning experiences, the only data that was formally gathered was on the participating programs teachers/leaders, the number of children participating, and the approximate grade levels (difficult in afterschool programs).

We were hoping to present these lessons as efficient and affordable ways for teachers and students to more actively and responsibly take part in our agricultural system by growing food (sprouts) and analyzing and managing healthy soils. At the same time, we were able to meet the participating classroom teachers and educational groups where they were at and provided

supporting learning materials, delivered lessons, and encouraged our target audience to participate in a more sustainable form of agriculture.

In the sprouting lessons, we developed assessment tools to help indicate whether or not children had an understanding of the requirements of seeds to sprout and also supported them as they constructed scientific investigations to gather evidence to support their explanations. For the worm composting lessons, we expected the children to explain how to construct a model compost ecosystem to both maintain a worm population and produce castings that will help supplement garden/farm soils. During the soil analysis lesson, we expected the children to be able to explain the different types of soil based on their physical characteristics and identify soils that would best support plant growth based on texture and structure. Unfortunately, we did not keep detailed records of student performance on these assessments that would have allowed for a more in depth analysis of our curriculum and student learning. In the future, our organization plans to continue to use our assessment tools to gather insight into the way students view soil, plants, food, and the agricultural system. This grant provided the resources necessary for our organization to start on our path towards understanding the way people learn about agricultural resources and products.

F. DISCUSSION. *What did you learn from this project? How has this affected you and the young people you are working with? Were the results what you expected? If not, why? Are there changes you would make if trying this project again or recommending it to others?*

This project has been an important learning experience for our organization that has facilitated our growth and maturation as we learn to reconnect our communities to good food and healthy environments. In further developing the educational department of our organization, this project has helped us learn to (1) build strong relationships with our educational collaborators, (2) use easily accessible learning materials, and (3) remain flexible and resilient.

To implement and disseminate these lessons and learning experiences, we looked first to small professional development programs to train teachers using our curricula and materials. During this training session in the Summer of 2011, we also hosted a weeklong summer camp with elementary age students that provided an audience for the teachers to pilot their programs. Using our existing relationships with the MU Science Education Center and the Office of Science Outreach, we were able to simultaneously train teachers in how to use our lessons and also give them the confidence that they could use these lessons in their own class. Several of the teachers who participated in this training reported to use and adapt the lessons to meet their own classroom needs. Over time, these types of relationships and training program helped create lasting changes in the teachers' pedagogical practices using the materials that this grant provided. Further, in the classrooms that we visited to deliver lessons, we invested a lot of energy into maintaining longer term relationships. This helped build the reputation of CCUA and also encourage the confidence and teacher transformation. Through some preliminary research (Murakami, Stuart, & Witzig, in preparation) we found that teachers perceive food or agricultural-based science teaching as a worthy endeavor, but for example, the teachers lack the skills or confidence to draw connections between required science standards and topics embedded in soil investigations. This grant helped us build those connections for teachers so that they can engage students in the important area of soil health.

Initially, we planned to provide chemical soil analysis kits as part of our lesson plan resources, however, we learned to keep the materials accessible for teachers as well as students. We opted for more engaging and affordable preliminary soil analysis techniques like soil fraction

analysis, water percolation, and hands on texture analysis. Keeping learning materials accessible and easily affordable meant that the children would have another opportunity to literally connect with the soil, but also make it more likely for these lessons and skills to carry over into future years. As we continue to refine our lesson plan materials, we are being very intentional in order to make materials easily used and adaptable for teachers, however, we hoped to be further along with this process. Creating lesson plans that are adaptable for a general audience, but also immediately useful for teachers is a difficult curriculum design task that will continue to be tackled by our education coordinator and Americorps VISTA.

During the classroom visits, it was most important for us to use our time efficiently in preparing for a meaningful and relevant learning experience for the students and teachers. Often, this meant we had to be flexible in terms of when the lessons would occur (e.g. when the teachers were studying ecosystems), or our materials had to be flexible and teach multiple standards (e.g. plant anatomy or experimental design). This flexibility and fluency in academic standards, allowed us more opportunities to collaborate with teachers. If organizations consider developing and disseminating lessons to school age children, it is important to first understand the partner teachers' constraints and learn to be resilient and creative in making connections to the sustainable agriculture based curriculum. Fortunately, lessons in sustainable agriculture are dynamic and easily connected to many topics across the disciplines.

3. OUTREACH

How did you share information from your project with others? Who were you trying to reach? What methods did you use for telling others about: a. Your project, b. Project activities or events, c. Project results? Be sure to include the names and dates of outreach activities and events and the number of people who attended. Was there media coverage of your project? What plans do you have for future outreach?

Please enclose any press releases, news clippings, flyers, brochures, or publications developed during this project. Also send any photos that might be helpful in telling your story to others. Please be sure to get permission to use the photos if they include other people. For photos with children, you will need a parent's permission. Please fill out and turn in a NCR-SARE Image Consent form along with your photos.

The forms of outreach for our project were through our website (www.columbiaurbanag.org), conference presentations, professional development programs, farmers' market booths, and outdoor street fairs (Peace Works Earth Day Street Fair) and annual celebrations (Harvest Hootenanny).

CONFERENCE PAPER PRESENTATIONS:

Murakami, C.D., Stuart, P.E., Witzig, S.B., & Waldron, A.M. (March 28, 2012) *Exploring science teacher attitudes towards instruction through foods, investigations, soils, and healthy habits. National Association for Research in Science Teaching. Indianapolis, IN.*
(Approximately 30 Science Education Researchers in attendance)

CONFERENCE POSTERS

Murakami, C.D. (August 4, 2011). Schoolyard gardening for all: a historical perspective and framework for schoolyard gardening programs in public education. Sustainable Agriculture Education Association. Lexington, KY
(Approximately 200+ Sustainable Agriculture Educators in attendance)

PROFESSIONAL DEVELOPMENT PROGRAMS

Teaching and learning about Foods, Investigations, Soils, and Healthy Habits (FISHH). Teacher development and Elementary Science Education program, 2011. Co-developed curriculum and led week long teacher training program for pre-service science teachers.
(9 teachers in attendance)

Through these diverse outreach opportunities, we were able to target local and international audience members interest in urban agriculture, garden education, sustainable agriculture, and environmental conservation.

LESSON PLANS

We are working on our lesson plan and teacher resource section of our website. At this time, we are investing a lot of human energy into creating a clear and useful space for teachers to access lesson resources, review lesson resources, and submit requests for new lessons.

4. PROGRAM EVALUATION

This was the third year the North Central Region SARE Program sponsored a Youth Educator Grant program. As a participant, do you have any recommendations for the regional Administrative Council about this program? Is there anything you would like to see changed?

Participation in this program has been relatively straightforward and the reporting process has been a useful reflection tool for our organization. Some of the reporting technology on the website could be more user friendly. For fear of not including important information, our organization chose to submit our final report through email rather than the online reporting system that was a bit clunky. It seems more efficient to build a standard template or form that they information from the final report can simply be copy and pasted in. Otherwise, we are grateful for the support of NCR SARE and hope to apply to be part of other projects in the future.

5. BUDGET SUMMARY

Complete the Final Budget Summary form and return it with your Final Report. The final budget form is similar to the budget form you turned in with your grant proposal. It has one additional column titled, Grant Funds Paid, so you can show what project items cost compared to your proposed costs. Only show grant funds spent even if you spent more than that amount. You can only use grant funds for expenses incurred and items purchased for conducting your project. If the amounts for items listed have changed significantly from the amounts listed in the proposal, please include an explanation with the final budget summary.

Our actual spending varied from what we had originally budgeted. This is in part due to miscalculations for supply costs and the fact that we reached out to more classrooms and students than originally proposed. Also, we decided against purchasing soil nutrient test kits and instead created a lesson that probed students to think about soil life and structure. We thought that the lesson we used which exposed students to the idea that soil is a conglomerate of many things, living and non-living was a more teaching tool than a lesson that reduced soil down to only three nutrients.