4-H Science in Urban Communities

Promising Practices Guide



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Suggested citation in APA format:

Ripberger, C., & Blalock, L. B. (2011). 4-H Science in urban communities promising practices guide. Retrieved from http://urban4hscience.rutaers.edu

Promising Practices Videos

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Acknowledgements

A special thank you to Eddie Locklear, Ed.D. and Ron Drum of National 4-H Council for all of their support throughout the project and to Jill Walahoski of the University of Nebraska for assistance with the project design.

This project was made possible through the generous support of the Noyce Foundation. Since 2006, the Noyce Foundation has been a sponsor of the 4-H Science Program, preparing 1 million young people to excel in science, engineering and technology - exposing them to a multitude of potential careers. Through new 4-H Science clubs, camps, and afterschool programs; innovative curriculum; and training for 3,500 4-H professionals and 540,000 volunteers, the Noyce Foundation is helping 4-H build a pipeline of our nation's future scientists and engineers.

About 4-H

4-H is a positive youth development organization that empowers young people to reach their full potential. A vast community of more than 6 million youth and adults working together for positive change, 4-H enables America's youth to emerge as leaders through hands-on learning, research-based 4-H youth programs and adult mentorship, in order to give back to their local communities. Visit <u>http://www.4-h.org/</u>.

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Dear 4-H Professional,

Welcome to the 4-H Science in Urban Communities Promising Practices Guide. This resource is the product of many dedicated urban 4-H professionals across the country. We appreciate and applaud the work they are doing to deliver quality 4-H Science programs to urban youth in a variety of settings.

Our contributors often spoke of a "journey," "small steps," and "beginning where you are now" when describing the *process* of developing and sustaining urban 4-H Science programs. We believe the metaphor of a journey is an easily understood way to discuss the process of bringing quality 4-H Science programming to urban youth audiences. We're happy you've decided to join us on what we're sure will prove to be an amazing and rewarding journey.

The first step in every successful journey is to know your starting point; therefore we'll begin by surveying the landscape. 4-H professionals today are faced with many challenges to sustaining current programming. Public monies are shrinking, requiring us to cobble together funding from nontraditional sources to support programs. In many states 4-H professionals have increasing or even multi-county responsibilities. In addition, the overall shift in volunteering from "lifers" to episodic involvement challenges program implementation.

We recognize that asking 4-H professionals to add "just one more thing" to an already overflowing plate will undoubtedly send more than one screaming into the night. However, with nearly 90% of the U.S. population currently living in urban or suburban areas, we *also* recognize that *urban youth desperately need access to high quality 4-H Science programs.*

We know you're only one person . . .

We know you don't have enough funding . . .

We know there are not enough hours in the day . . .

We know you need a magic bullet . . .

Do we have a magic bullet? No.

What we *do* have to offer is much better – because you need an *arsenal*. We believe that the promising practices contained in this guide will provide you with the tools you need (compass, maps, resources, and yes – even clothing suggestions) to help you plan, implement, reflect upon, and share an exciting journey into what for many of you will be a new world – a world where urban youth have access to content and context rich 4-H Science programs!

At the risk of sounding cliché, we'll remind you that a journey of 1,000 miles begins with a single step. But this journey is *not* a solo endeavor! 4-H professionals across the country are already in various stages of their journeys – and they welcome you as their travel companion. While our primary goal is to provide a wealth of information to help you succeed in this world of urban 4-H Science programming; it is also our hope that this guide will be the impetus for forming a thriving Community of Practice where 4-H professionals can come together and share their successes, challenges, and most importantly – support and encouragement.

Let us begin . . .

Lydia B. Blalock, Ph.D.





Introduction

The development of this resource has certainly been a journey for all involved (see *Project Design* below for more information). It was by turns challenging, uplifting, thought-provoking – and always exciting. We've asked ourselves: What does the successful (urban) 4-H professional look like in the 21st century? How does she work? What does he do? What skills do they have? What makes them successful – indeed – how *do* they define success?

Countless discussions, meetings, emails, and terabytes of data later we know the answer: The successful urban 4-H professional of the 21st century thinks and acts like – an *entrepreneur!*

Develop an Entrepreneurial Spirit

Think about it. What does a successful entrepreneur do? She raises capital, secures staff, develops partnerships, assumes risk, delegates responsibility, requires accountability, and so forth. His goal is to grow the enterprise, and views challenges as opportunities to exploit. First and foremost, however, successful entrepreneurs *begin with the end in mind*. She has a plan – a *strategic* plan – and she uses it to guide her journey in the appropriate direction.

And therein lies the challenge. The successful urban 4-H professional of the 21st century must be willing to embark upon a journey that will ultimately result in a transition from 4-H Event and Volunteer Manager to Executive Director of your local 4-H Youth Development program. These "new" urban professionals must be fully engaged in resource development. Our successful contributors exemplify the spirit of entrepreneurial trailblazers by using a variety of mechanisms to obtain the support needed to implement and sustain programs, including grants, subcontracts, and in-kind contributions. They are fully engaged in "being at the table" – building awareness of 4-H and 4-H Science in any and all venues – and they welcome opportunities to develop and sustain successful partnerships with other youth serving organizations, corporations, city governments, and so forth.

Just to clarify – an entrepreneurial spirit does *not* imply abandoning traditional 4-H roles, values, or concepts. Indeed, the rallying cry for 4-H Science is – *informal science education in the context of positive youth development*. 4-H is, and always will be about the *Essential Elements* – *Belonging, Mastery, Independence, and Generosity.* 4-H will continue to hold events and manage volunteers – but – the entrepreneurs among us will delegate more of their traditional responsibilities as they shift to providing programmatic vision to, and building programmatic capacity within, their organizations.

We've identified four things *entrepreneurial* urban 4-H professionals *do* to achieve success: (a) embrace program design, (b) promote partnerships, (c) build programmatic capacity, and (d) tell their 4-H Science story. These items make up the bulk of the promising practices in the 4-H Science in Urban Communities Promising Practices Guide.

Embrace Program Design

Conversation between Alice and the Cheshire Cat:

'Would you tell me, please, which way I ought to go from here?' 'That depends a good deal on where you want to get to,' said the Cat. 'I don't much care where –' said Alice. 'Then it doesn't matter which way you go,' said the Cat.

- Lewis Carroll, Alice's Adventures in Wonderland

Successful travelers know their final destination (*begin with the end in mind*). They are alert for signs, mile markers and other indicators or benchmarks of progress. In the same way, *successful* entrepreneurs know where they want to go – and how they're going to get there. Successful entrepreneurs use *business plans* to guide them to their destinations: Successful 4-H professionals use *Logic Models*!

The 4-H Science in Urban Communities Promising Practices Guide begins with Section I - 4-H Science Core Principles and Program Design. The chapters within this section will help you determine your destination and explore alternate routes to get there. The emphasis is on developing and sustaining comprehensive, high quality informal science education programs (as opposed to one-time events or activities), and in identifying your unique programmatic niche or focus (training, resources, program design, implementation, etc.).

There are four chapters in this section that address the content and context of quality 4-H Science programs. The purpose of the first chapter, 4-H Science Program Design - 4-H Science Checklist, is threefold: (a) to introduce the 4-H Science Checklist; (b) to provide promising practices to support each of the seven criteria of the 4-H Science Checklist; and (c) to promote 4-H Science 101, a scripted, four-hour training that can also serve as a crucial resource for developing "science ready" programs. Inquiry Based Learning Approaches contains promising practices to help program planners and facilitators implement successful inquiry based 4-H Science programs. Providing Youth Authentic Opportunities to Practice and Share Science Abilities reminds 4-H professionals to plan for such opportunities during the program design stage, and provides venue and activity suggestions.

The most robust program designs will fail to achieve expected results if program facilitators are not adequately trained or supported to consistently (and correctly) deliver programs. The final chapter, *Training Others to Deliver High Quality Science Programming*, addresses this issue of fidelity of implementation.

Promote Partnerships

The successful entrepreneur understands that creating strategic partnerships with like-minded organizations can be richly rewarding for everyone involved. A solid partnership easily doubles (or more) the "sum of its parts." Strong partners are committed to sharing the journey (as well as resources!). They complement or support each others' strengths and weaknesses. Sustainable partnerships have good communication networks, distribute rewards and recognition equitably, and ultimately reach or even exceed mutually agreed upon goals and objectives.

The importance of promoting partnerships to successful 4-H Science programming was underscored by the initial survey of the 4-H system (see *Program Design* below for more information). Almost all respondents indicated the only way to achieve success in an era of shrinking budgets and increased service demands was to *partner, partner, partner.* 4-H professionals need to identify youth development and science partners who support informal science learning (in the context of positive youth development) and who are able to provide complementary resources.

Perhaps the most overlooked "partners" in any discussion about partnerships are the 4-H professionals' state level partners. Extension and University leaders must be sincerely committed to providing *continuous* and *tangible* support to urban 4-H Science programming. To expect 4-H professionals to achieve success in urban settings *without* providing the ways and means to do so sets the stage for unrealized opportunities.

Section II - Partnerships, Resource Development, Program Growth and Sustainability provides a plethora of promising practices to help you promote mutually beneficial partnerships. This section begins with a vital introduction that includes Overarching Principles for creating sustainable partnerships. This information is not duplicated within the ensuing





chapters, and therefore should not be overlooked.

The six chapters in *Section II* are each devoted to a different type of partnering organization. The first two chapters focus on more traditional 4-H partners. *Partnering with Afterschool Providers* outlines promising practices to help you develop and sustain successful 4-H Science afterschool programs, while *Partnering with Summer Program Providers* addresses summer camp and summer day program partners.

The next three chapters introduce potential partners who may be new to many 4-H professionals. Partnering with City Government and City Parks and Recreation, Partnering with Colleges and Universities and Campus-Based Scientists, and Partnering with Science Centers and Museums each contain practical information and ideas for developing and sustaining successful relationships with these entities. The final chapter in this section, State Level Practices to Advance Urban Programming, provides concrete suggestions for strengthening state level Extension and University support for urban 4-H programs and professionals.

Build Programmatic Capacity

Entrepreneurs know they cannot be everywhere nor do everything by themselves. They rely upon outstanding staff to achieve and maintain success. They understand the importance of recruiting/selecting the right man or woman for the job, and provide continuous support to help staff do their best work. 4-H professionals also know they cannot do everything themselves. How well we navigate our road to successful urban 4-H Science programming depends upon our commitment to building programmatic capacity – in this case – recruiting/selecting and supporting the right associate, collaborative, and/or volunteer staff for the job!

Staffing, Recognition, and Marketing is the third and final section in the 4-H Science in Urban Communities Promising Practices Guide. The first three chapters in this section provide exemplary promising practices to support building programmatic capacity. Staffing with Content Rich Volunteers will help 4-H professionals extend their reach by maximizing their ability to recruit and retain science professionals and serious science-based hobbyists. The purpose of Staffing with AmeriCorps Members is to help program planners understand how AmeriCorps members can be utilized to develop and sustain programs. Staffing with Teenagers and Teens as Cross-Age Teachers provides suggestions about how to locate, recruit, and sustain teens interested in working with 4-H Science programs.

Tell Your 4-H Science Story

One of the hallmarks of successful entrepreneurs is their ability to successfully communicate with others (partners, shareholders, customers, etc.) They – or more likely their support staff – are adept at showcasing achievements and marketing and branding their products and services. (The successful entrepreneur would *never* brag about being "the best kept secret" in the business world!) Explorers throughout history fully appreciated the importance of documenting and sharing the excitement of their discoveries with their stakeholders. Failure to document their successes would have resulted in lack of support for future explorations!

As 4-H professionals make inroads into the world of urban 4-H Science programming, they have the unique opportunity to disseminate the 4-H Science story while shaping public perception about who 4-H is and what 4-H "does." The final two chapters in *Section III – Staffing, Recognition and Marketing* underscore the importance of sharing the 4-H Science story. *Recognizing Youth and Showcasing Programmatic Efforts* will help 4-H professionals understand the value of providing youth appropriate, meaningful recognition and of showcasing programmatic efforts. Marketing and Branding 4-H *in Urban Communities* makes a strong case for consistent branding of all 4-H programs and provides some basic ideas for

marketing and branding your 4-H Science programs.

The journey to provide urban youth with content and context rich 4-H Science programming requires the 21st century urban 4-H professional to engage in a personal journey to cultivate an entrepreneurial, trailblazing spirit. Reading this guide is but the first step of what we know will be an exciting – and rewarding journey for all.

Project Design

The 4-H Science in Urban Communities Promising Practices Guide is a truly collaborative work. An advisory team, consisting of 4-H professionals and informal science education and youth development partners, met at the St. Louis Science Center to set the stage for this resource. After much deliberation and perusal of existing resources, the team delineated 15 content areas for inclusion in the guide and determined the appropriate formats for this resource – electronic publication, supporting website, and short video segments to highlight selected content areas.

The advisory team developed an electronic survey to learn more about existing urban 4-H science programs. State 4-H program leaders and 4-H science liaisons were asked via email to participate in the survey. Respondents were also asked to nominate 4-H professionals from their states who were currently implementing urban 4-H Science programs to serve as contributors to this resource.

Of the 4-H professionals nominated, 18 were asked to contribute to the resource based upon their exemplary work in the field. These women and men represent a diversity of urban communities (Sacramento, Houston, Kansas City, Minneapolis, New York City, etc.), geographic regions (northeast, north central, south, west), target audiences (young women, Latino, Lakota Indian, African American, etc.), programs (marine science, robotics, hydroponics, geospatial, wetlands conservation, aerospace, etc.) and delivery modes (4-H Afterschool, summer programs, camps, clubs, etc.).

What these 18 men and women have in common, however, is the *entrepreneurial spirit and passion* required to be a successful 4-H professional in urban communities today. It is not an overstatement to say that these contributors brought a wealth of knowledge and experiences to this undertaking, which is why the 4-H Science in Urban Communities Promising Practices Guide is so content rich. Rarely in the authors' experiences has such a diverse group functioned with such singleness of mind.

The contributors were asked to each select five of the pre-determined content areas based upon their expertise, and for each area to provide a summary of their efforts, promising practices, suggested resources, and video highlighting their reflections in their chosen areas. Conference calls were scheduled to discuss and build consensus around promising practices for each content area. Contributors were invited to participate in any content area call, regardless of whether it was one of their selected areas. A summary document organized by themes was compiled from the promising practices submitted by the contributors. The relevant summary document was distributed prior to each conference call, and served as an organizing tool for the discussion. Each call lasted from 1-2 hours, followed by a 1-2 hour debriefing between the authors.

The information provided from the conference calls, as well as other documents and resources submitted by the contributors were used to produce the content included in this resource. The video segments were selected based upon raw video received from the contributors. The raw footage was indexed by content, and six content areas were selected for inclusion as highlight video segments. Photographs were chosen from those submitted by the contributors to illustrate "talking points" and add interest to the videos.





How to Use this Resource

The 4-H Science in Urban Communities Promising Practices Guide includes three complementary resources: (a) the primary electronic publication, (b) a website, and (c) highlight video segments.

Electronic Publication

The focus of this publication is on the promising practices, which are divided into three major sections: 4-H Science Core Principles and Program Design; Partnerships, Resource Development, Program Growth and Sustainability; and Staffing, Recognition, and Marketing. Each section includes several chapters devoted to specific content areas, and each chapter includes:

- *Chapter introduction* provides important context for the promising practices that follow.
- *Promising practices* the heart of each chapter; majority of chapters include subsections on program planning and evaluation, training, and support.
- *Case studies* vignettes submitted by contributors that highlight practices discussed within the chapter.
- *Resources* websites and publications/documents that may be helpful to the readers.

It is worth noting that *Partnerships, Resource Development, Program Growth and Sustainability* includes a special introduction that contains overarching principles for this section. This introduction is often referenced in the chapters, and contains information critical to developing and sustaining partnerships and programs.

The publication concludes with *Contributor Bios, Program Descriptions* (*Sustained 4-H Science Programs* and *Promising 4-H Science Programs*), and a master list of all *Resources* contained within the chapters.

The electronic publication can be accessed for online viewing from the *4-H Science in Urban Communities* website (*http://urban4hscience.rutgers.edu*). It is also available for download as a single PDF document or as individual chapters. The publication can be read front-to-back, specific chapters can be read as needed, or chapters can be printed for use in trainings.

Project Website

The supporting website (<u>http://urban4hscience.rutgers.edu</u>) for this resource includes all the content from the electronic publication, plus PDF documents, a master list of resources, and the highlight video segments. Links can be made to the website for trainings – or links can be sent to program partners, funders, key stakeholders, and so forth to support programming efforts.

Highlight Video Segments

There are six video segments included as part of this resource: *Project Overview;* 4-H Science Program Design - 4-H Science Checklist; Providing Youth Authentic Opportunities to Practice and Share Science Abilities; Training Others to Deliver High Quality Science Programming; Partnering with Afterschool Providers; and Staffing with Teenagers and Teens as Cross-Age Teachers. The videos are located on the Videos page of the website (<u>http://urban4hscience.rutgers.edu/videos.html</u>) as well as in the relevant chapters. These video segments could be sent to program staff and partners, and could be used to add interest and excitement to relevant 4-H Science presentations and trainings.

This resource is brought to you by 4-H, through the generous support of Noyce Foundation.

4-H Science Program Design –4-H Science Checklist

Introduction

4-H Science is informal science education within the context of positive youth development. It is *not* just science education. This is an important distinction to make when approaching potential program partners and funders.

4-H Science is committed to delivering "Science Ready" 4-H experiences. A science ready program is framed in science concepts, based on science standards, and intentionally targets the development of science abilities and outcomes articulated by the 4-H Science Logic Model (see 4-H Science 101 in Resources below). Additionally, science ready programs integrate the Essential Elements of 4-H Youth Development (Essential Elements) and engage participants in age appropriate, experiential, inquiry-based learning.

It is important to understand from the beginning that a "program" is much more than a one-time activity. Ideally, programs should be of sufficient frequency (how often the program meets) and duration (how long the program runs – days, weeks, months, etc.) to allow youth to experience and increase mastery, independence, sense of belonging, and a spirit of generosity *(Essential Elements)*. Programs are delivered within the appropriate positive youth development (PYD) framework (safe environment, caring adult, etc.).

The 4-H Science Checklist (see below) includes seven questions designed to help assess whether science programs are "Science Ready." Science ready programs provide youth with a sustained learning experience, with opportunities to engage in the program for the appropriate frequency and duration needed to master specific 4-H Science Abilities (see 4-H Science Checklist below). Program activities are also sequenced to help youth build upon previously learned skills. Science ready programs are *not* one-time activities or events.

The goal for 4-H Science programming in all venues is to move beyond offering activities to providing youth with ongoing, sequential programming that leads to mastery. Building science ready programs takes time – rarely does a newly created program launch with all systems firing perfectly! The important thing is to get started. Begin with current programs and carefully target areas for improvement.

The purpose of 4-H Science Program Design – 4-H Science Checklist is threefold: (a) to introduce the 4-H Science Checklist; (b) to provide promising practices to support each of the seven criteria of the 4-H Science Checklist and (c) to promote 4-H Science 101, a scripted, four-hour training that can also serve as a crucial resource for developing "science ready" programs (see 4-H Science 101 in Resources below). The 4-H Science Checklist (below) will help program planners self-assess the science readiness of current programs, as well as provide guidance for developing new science ready programs. 4-H Science 101 includes a simple-to-use table that can aid with self-assessment of program activities (see Appendix I – Make a Better Pinwheel: Review and Share).



Promising Practices

The promising practices that support "4-H Science Readiness" are divided according to the seven items on the *4-H Science Checklist* (see sidebar).

National Science Education Standards

- Include teens in program planning, implementation, and evaluation. Teens may be one of the most underutilized resources available to 4-H professionals engaged in developing 4-H Science programs. Teens can assist in creating and implementing needs assessments, identifying engaging curriculum, facilitating programs, data collection and evaluation, and so forth. In addition, utilizing teens as cross-age teachers/mentors opens up lots of opportunities for positive youth development (see also <u>Staffing with Teenagers and Teens as Cross-Age Teachers</u>).
- 2. Utilize the planning and evaluation tools included in 4-H Science 101. This resource is a user-friendly guide that can provide assistance with professional development, program planning, and evaluation (see 4-H Science 101 in Resources below). The resource includes:
 - The 4-H Science Logic Model will aid with program development and provides outcomes for program evaluation.
 - The 4-H Science Needs Pre and Post Assessments will help assess staff and organizational capacity to deliver 4-H Science programs.
 - The 4-H Science Core Competencies and the 4-H Science Competencies Self-Assessment Tool will help focus program development in the context of positive youth development, as well as guide professional development trainings (see Item #3 in Trained, Caring Staff and Volunteers as Co-Learners below and Training Others to Deliver High Quality Science Programming).
 - The Program Evaluation Development Worksheet will help outline the evaluation component of the program.
- 3. Develop measurable process and outcome objectives. Work with program partners to create meaningful objectives. Keep in mind reporting needs (including partners) and ensure there are objectives to address those needs.
 - Process objectives focus on program design and implementation.
 - Outcome objectives include changes in youth abilities, skills, knowledge, attitudes, behaviors, etc. Do not forget to specify relevant 4-H Science Abilities from the 4-H Science Checklist.
- 4. *Identify success criteria/indicators for process and outcome objectives.* Include assessment criteria for staff/ facilitators, as well as the partnership (if applicable).
 - Contact campus-based faculty/specialists in program evaluation for assistance.
 - Outline data collection and analysis responsibilities and timeline with program staff/volunteers (include in MOU if a partnership see <u>Section Introduction</u> to the Partnerships, Resource Development, Program Growth and Sustainability section).

4-H Science Checklist

Are you providing science, engineering and technology programs based on National Science Education Standards? [National Science Education Standards]

Science education standards are criteria to judge quality: the quality of what young people know and are able to do; the quality of the science programs that provide the opportunity for children and youth to learn science; the quality of science teaching; the quality of the system that supports science leaders and programs; and the quality of assessment practices and policies.

http://www.nap.edu/readingroom/books/nses/

Are you providing children and youth opportunities to improve their Science Abilities? [4-H Sciences Abilities]

Predict, Hypothesize, Evaluate, State a Problem, Research Problem, Test, Problem Solve Design Solutions, Measure, Collect Data, Draw/ Design, Build/Construct, Use Tools, Observe, Communicate, Organize, Infer, Question, Plan Investigation, Summarize/Relate, Invent/ Implement Solutions, Interpret/Analyze/Reason, Categorize/Order/ Classify, Model/Graph/Use Numbers, Troubleshoot, Redesign, Optimize, Collaborate, Compare

Are you providing opportunities for youth to experience and improve in the Essential Elements of Positive Youth Development? [Essential Elements of Positive Youth Development]

Do youth get a chance at **mastery** – addressing and overcoming life challenges in your programs?

Do youth cultivate **independence** and have an opportunity to see oneself as an active participant in the future?

Do youth develop a sense of **belonging** within a positive group?

Do youth learn to share a spirit of **generosity** toward others?

Are learning experiences led by trained, caring adult staff and volunteers acting as mentors, coaches, facilitators and co-learners who operate from a perspective that youth are partners and resources in their own development? [Trained, Caring Staff and Volunteers as Co-Learners]

Are activities led with an experiential approach to learning? [Experiential Approach]

Are activities using inquiry to foster the natural creativity and curiosity of youth? [Inquiry Based Approach]

Does your program target one or more of the outcomes on the 4-H Science Logic Model and have you considered the frequency and duration necessary for youth to accomplish those outcomes? [Frequency and Duration]

- IMPORTANT: Program evaluation/assessment criteria and data collection methods may need to be
 creative, and should certainly capture the spirit of 4-H Science programs (e.g., focus on science/inquiry
 processes, the Essential Elements of Positive Youth Development, foundational skills, etc.). Perhaps the
 worst thing that can happen regarding evaluation/assessment is if the facilitator feels he/she must "teach
 to the test" so youth can "successfully" complete knowledge-based assessments. This poses a very real
 danger of stifling the inquiry process!
- 5. Share evaluation results. Program successes should be disseminated to partners, stakeholders, advisory boards, funders, the community, etc. Present results at meetings and professional conferences. Prepare reports, press releases, and journal articles as appropriate.
- 6. Select inquiry- and research-based science curriculum that supports program goals. This practice cannot be over-emphasized. For more in-depth information see *Item # 1* in the *Program Planning* and *Evaluation* section of <u>Inquiry Based Learning Approaches</u>.
- 7. Correlate science programming with state and national educational standards. Demonstrate to formal education partners how informal science education can support (increase foundational skills) classroom learning.
- 8. Develop programs using modified club formats. Remember that 4-H Science is science in the context of positive youth development (PYD). As much as possible, incorporate traditional 4-H club components that support PYD such as public presentations, leadership, community service, etc.
- *9. Recognize that youth can be scientists today.* Plan activities that allow youth to "be" scientists today, and to see themselves as scientists tomorrow.
 - Youth should use "real" tools and instruments and engage in "real" projects (e.g., water quality monitoring, GPS/GIS community mapping, etc.). Create a program name that includes the word "scientist."
 - Use appropriate titles for the roles that group members will undertake (e.g., engineer, project manager, recorder, reporter, technician, materials coordinator, etc.). Ensure each group member has the opportunity to experience each activity and role.

4-H Science Abilities

- 1. Read the chapter <u>Providing Youth Authentic Opportunities to Practice and Share Science Abilities</u>. This chapter provides an in-depth discussion of promising practices.
- 2. Incorporate opportunities for youth to practice 4-H Science Abilities. Clearly identify the Science Abilities included in the program and/or curriculum (if unable to identify, look for another program/curriculum). The identified abilities should be specified in the program goals, and assessed as part of program evaluation.

Essential Elements of Positive Youth Development

- 1. Provide a youth development focus. Do not overlook context in favor of content. Foster belonging, mastery, independence and generosity. Ask these questions:
 - Do youth have a chance to make decisions?
 - What new skills does the program or activity foster?
- 14 4-H Science Core Principles and Program Design





- Programmatically, how can the program or activity reach beyond the realm of science to become a positive youth development experience and a fun one?
- 2. Use the <u>4-H Science Core Competencies</u> to guide program planning and implementation. 4-H Science is, above all, informal science programming in the context of positive youth development. 4-H Science core competencies identify how staff/volunteers can be competent and caring resources to youth, organizations, and communities. 4-H youth development professionals and volunteers implement 4-H Science programs that offer the eight *Essential Elements* (see 4-H Science Core Competencies in 4-H Science 101 in Resources below). Competencies include:
 - <u>Caring Adult</u>: Understands that each young person benefits from a positive relationship with a caring adult by . . . (see 4-H Science Core Competencies).
 - <u>Safe Environment:</u> Creates an emotionally and physically safe learning environment by . . . (see 4-H Science Core Competencies).
 - <u>Inclusive Environment (belonging)</u>: Designs inclusive learning environments by . . . (see 4-H Science Core Competencies).
 - <u>See Oneself in the Future (sense of hope)</u>: Nurtures an atmosphere of optimism and a positive belief in the future by . . . (see 4-H Science Core Competencies).
 - <u>Values and Practices Service to Others:</u> Encourages an ethic of caring and civic responsibility by . . . (see *4-H Science Core Competencies*).
 - <u>Opportunities for Self-Determination</u>: Encourages and supports independence in youth by . . . (see 4-H Science Core Competencies).
 - <u>Opportunities for Mastery:</u> Provides opportunities for youth to develop skills, competence, and expertise by . . . (see 4-H Science Core Competencies).
 - <u>Engagement in Learning</u>: Encourages youth to direct and manage their own learning by . . . (see 4-H Science Core Competencies).
- 3. Pair service-learning with science. Provide opportunities for youth to engage in authentic, community-based projects that also support learning objectives and the *Essential Elements*. This is where youth have a chance to voice opinions, make decisions, plan and carry out ideas, and feel like they have made a difference (see also *Providing Youth Authentic Opportunities to Practice and Share 4-H Science Abilities*).

Trained, Caring Staff and Volunteers as Co-Learners

- 1. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers to deliver 4-H Science programs.
- 2. Utilize the <u>4-H Science Competency Self-Assessment</u> with staff and volunteers. Program staff/volunteers need to understand and have the capacity to effectively implement the core competencies in the context of program activities. This tool will help improve 4-H Science program delivery and aid in staff development, but is not intended for use in performance reviews (see 4-H Science 101 in Resources below).

- This assessment will reveal strengths and challenges in implementing the core competencies.
- Review results individually with staff/volunteers and help them set personal goals.
- Develop training modules based upon overall results to address opportunities for improvement.
- 3. Remind staff and volunteers often that they should be "co-learners" with youth. Staff/volunteers should understand they are not there to provide answers (indeed, it's okay to not have the right answer). They must be willing to explore and learn together with youth. This principle can be especially difficult for staff/volunteers coming from the formal education system. One way to circumvent the tendency to provide answers is to engage in "real" community-based projects that do not yet have a solution!
- 4. Engage youth as partners in their own development. This practice goes hand-in-hand with experiential and inquiry based learning.

Experiential Approach

- 1. Read the chapter <u>Providing Youth Authentic Opportunities to Practice and Share Science Abilities</u>. This chapter provides an in-depth discussion of promising practices for practicing and sharing 4-H Science Abilities.
- 2. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers to deliver 4-H Science programs.

Inquiry Based Approach

- 1. Read the chapter <u>Inquiry Based Learning Approaches</u>. This chapter provides an in-depth discussion of promising practices to support inquiry based learning.
- 2. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an indepth discussion of promising practices for training staff and volunteers to deliver 4-H Science programs.

Frequency and Duration

- 1. Utilize the planning and evaluation tools in 4-H Science 101. See Item #2 in National Science Education Standards section above.
- 2. Plan adequate time and experiences for youth to achieve mastery of 4-H Science Abilities. There is no magic number as to the number of hours it will take youth to master any given set of skills or abilities. Much depends upon the previous background and experience of youth, in addition to the degree of difficulty of the skills. Review what has worked for others. It may take several program cycles to arrive at the ideal program frequency and duration.

Case Studies

Bird – Three Programs: Three Levels of Science Readiness. The *4-H Science Checklist* is the marriage of good science education with sound youth development practices. It defines not just what constitutes quality science learning, but also the environment in which it happens. The three 4-H Science projects in Sacramento County are at different levels of science readiness when assessed against the seven components listed in the checklist. Sacramento START staff are trained to deliver the 4-H Water Wizards Project. One of the challenges in this delivery mode is helping staff





understand how to nurture leadership in young people. The environment of the Sacramento START program focuses on education in a traditional way, and less on youth development principles. The other two programs are a rich blend of science and youth development. Attention is given to assuring that the science is experiential, inquiry-based, focused on process as well as content, and led by trained teachers. 4-H On the Wild Side: (a) brings teenagers and adults together to plan the weekend camp experiences; (b) engages youth in authentic leadership roles as they teach, write grants, and take charge of groups of children; (c) promotes mastery as teens improve in delivering their lessons; (d) nurtures a sense of belonging for campers through their schools and living groups; and, (e) promotes independence through the experience of going away to camp. The same holds true for the 4-H YES Project as teens have a sense of making a difference in their community through authentic leadership roles. In all instances, caring adult coaches/facilitates support the teens and the learning. **–Marianne Bird, University of California**

Enfield – Youth/Adult Science Clubs Supporting Science and PYD Outcomes. Youth/Adult Science Clubs is a program piloted, developed, and evaluated through the University of California 4-H Youth Development Program in San Luis Obispo (SLO) County. This program is most often referred to as simply SLO SCIENTISTS. SLO SCIENTISTS has demonstrated efficacy and sustainability for the past 15 years and has been featured as a model program at science and youth development conferences, as well as in the literature on youth development. 4-H SLO SCIENTISTS focuses on developing science clubs where a youth aged 8-12 enrolls with an adult (a parent, significant adult or mentor). Each youth-adult pair or dyad participates in learning and practicing the skills of scientific investigation through volunteerfacilitated, hands-on inquiry based STEM activities. Dyadic learning is complemented with group learning to create a dynamic where knowledge is co-created and learning is mutual. Club cycles are 8-10 weeks long, each with a specific curricular focus, and dyads can and often do choose to continue for multiple cycles (with different curriculum). Clubs are facilitated by a trained volunteer recruited for his/her interest in teaching science to youth.

4-H SLO SCIENTISTS experiences combine the best practices in informal science education and peer-reviewed STEM curriculum materials. These are then implemented within a context of positive youth development designed to create focused, engaged, articulate, and enthusiastic science learners. The one-to-one experience of a youth and adult experiencing scientific discovery is central to the unique approach taken by 4-H SLO SCIENTISTS. The goal is to not only increase science literacy, but also to strengthen the capacity of youth to envision themselves as confident, competent, and engaged science investigators and future scientists. Another goal of 4-H SLO SCIENTISTS is to increase the quantity and quality of youth/adult communication or "family dynamics," both about science and non-science experiences. **–Richard Enfield, University of California**

Resources

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery, and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support 4-H Science programs. Includes the 4-H Science Checklist, 4-H Science Competencies, and Experiential and Inquiry-Based Learning Methods in 4-H Science. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Inquiry Based Learning Approaches

Introduction

"Tell me and I forget, show me and I remember, involve me and I understand." - Chinese Proverb

Science is, by its nature, inquiry based. Inquiry is an approach to learning that utilizes discovery and scientific thinking processes to explore and learn knowledge and skills. In order to achieve this, facilitators of inquiry based learning must create an environment rich with experiences that allows learners to act on their own curiosity. Youth need experiences that will stimulate their thinking and provoke questions (inquiry). Such experiences will help develop logical thinking abilities.

Formal science education is primarily focused upon transfer of knowledge from teacher to student. Teachercentered learning usually incorporates a great deal of memorization. Inquiry, on the other hand, is *learner* centered. Inquiry requires action on the part of the learner: a *search* for information, a *pursuit* of knowledge, the *exploration* of phenomena in order to better understand the world. Provide youth with opportunities to explore environments and participate in activities designed to help them develop their own understanding – ultimately creating new knowledge for themselves. Involvement leads to understanding!

Thus, inquiry based learning requires:

- Learner-centeredness;
- Active, open questioning;
- Opportunities for active investigations that include the acquisition of knowledge and skills through observing and manipulating (mentally or physically) objects, phenomena, and/or nature.

A critical element for science inquiry is the need (or want) to find answers to questions or solutions to challenges. Scientists are the first to admit that engaging in the process of science discovery is *not* a strictly linear pursuit. Scientists do *not* engage in cookbook science! Science professionals practice inquiry. Science discovery begins with observations, with asking "how" and "why" and "when" and "what if" and "under what circumstances." Basic scientists observe phenomena, ask questions about what they have observed, and conduct experiments in order to deepen their understanding of the concept or event. Applied scientists are faced with a challenge and follow a similar approach that leads to development of solutions to the problem.

Allowing youth to engage in inquiry based learning allows them to experience science discovery and knowledge creation the way "real" scientists do! Providing youth with a challenge they *want* to solve is the first step in engaging them in inquiry based learning. It also allows youth to envision themselves as "real" scientists – doing "real" science – TODAY!

Facilitating inquiry based learning *does* require appropriate training (and often un-learning) in how to best guide youth experiences. The good news is that inquiry based learning should substantially reduce any fear non-science facilitators have about "knowing the right answer." Encourage facilitators to embrace the concept of co-learning





with the youth to discover solutions to challenges and develop understanding. Facilitators should also recognize that the inquiry process can be loud, messy, and at times lengthy. Some people, especially those from the field of formal education, may feel a certain loss of control because activities do not seem to progress in a "cookbook" fashion. Reassure them that chaos does not equate to a "bad" learning experience as long as youth are engaged in the challenge at hand.

The purpose of this chapter is to share promising practices to help program planners and facilitators understand and implement successful inquiry based 4-H Science programs. A little more structure and support may be needed the first few times an inquiry based learning approach is implemented, but if done well future sessions will require less structure and will become more learner focused. The results are well worth the effort, as youth become more comfortable with creating their own knowledge and understanding. This is a foundational skill that will serve them well in the formal education system, as well as throughout the course of their lives.

Promising Practices

The promising practices for *Inquiry Based Learning Approaches* are subdivided into three categories: (a) Program Planning and Evaluation, (b) Training, and (c) Program Delivery.

Program Planning and Evaluation

- Read the chapter <u>4-H Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to developing programs that support inquiry based learning.
- 2. Utilize existing inquiry- and research-based science curricula. Curricula should support inquiry based learning, be age appropriate, and incorporate all components of the experiential learning cycle, including application of what is learned. It should be built on a positive youth development framework (*Essential Elements of 4-H Youth Development*).
 - Take the time to identify and procure the highest quality curriculum possible, using the 4-H Science Checklist as a guide (see <u>4-H Science Program Design – 4-H Science Checklist</u>). Train facilitators to properly use selected curriculum (see <u>Training Others to Deliver High Quality Science Programming</u>).
 - Using inquiry based curricula helps facilitators understand how science happens, and emphasizes that science is about the process of thinking and doing, not just learning facts.
 - Inquiry based curricula such as robotics and other design challenges create authentic environments where youth must work in teams and create an object to meet the prescribed challenge.
 - Curricula that are competitive in nature (may or may not be explicit) will motivate teams of youth to work toward a successful solution.
 - Do not ask program staff or volunteers to develop curricula. Most program staff/volunteers do not have the time, experience, or knowledge necessary to develop program lessons and activities that are sequential, experiential, age-appropriate, research-based, support inquiry, and so forth. For best results utilize existing inquiry- and research-based science curricula.
- 3. Create programs that focus on the inquiry process. The focus of inquiry based learning is on the process of doing science, not simply completing activities or projects. These processes (inquiry, observation, inference,





problem-solving, etc.) are the same scientists use in their everyday work.

- 4. Limit the number of activities facilitators need to complete in a session. Again, the focus is on the processes, not the activities. Plan for ample time after the activity for youth to explore, ask questions, share thoughts and information, reflect, and so forth.
- 5. Use rich contexts. Target existing, or develop rich contexts for learning that will provide lots of opportunities for questions and exploration. Seek out off-site locations that are unique or that will encourage discovery. Some urban areas may require a switch from viewing the larger environment to looking at the micro-environment.
- 6. Develop evaluation/assessment criteria, indicators, and data collection methods suited to the inquiry process. Program planners and evaluators may need to be creative in order to capture the spirit of 4-H Science programs (e.g., focus on science/inquiry processes, the *Essential Elements of Positive Youth Development*, foundational skills, etc.). Perhaps the worst thing that can happen regarding evaluation/assessment is if the facilitator feels he/she must "teach to the test" so youth can "successfully" complete knowledge-based assessments. This poses a very real danger of stifling the inquiry process!

Training

Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers to deliver 4-H Science programs.

Program Delivery

- 1. Prepare the room/area for the activity. Space should be separate from other activities and away from distractions, allow for easy movement of the facilitator and the youth, include access to a whiteboard/flipchart, have adequate tables and chairs, and have all materials readily available (see NPASS2 in Resources below).
- 2. Provide a brief introduction to the activity. Keep the introduction short. Review the previous activity; introduce the current activity with a story or scenario and relate it to the prior activity. There is no need to engage in application at this time (see NPASS2 in Resources below).
 - *Divide youth into teams.* Teamwork is an important life skill and 4-H Science Ability (see <u>4-H Science Program Design 4-H Science Checklist</u>).
 - *Present the activity as a challenge.* Provide youth with incentives and encouragement to solve the challenge. The incentive can be an inexpensive prize (4-H wristband, pencil, etc.), or some kind of snack.
- 3. Engage often with youth teams. Monitoring and interacting with the youth is just as important as the incentives.
 - Walk around the room, get close to their work, ask questions, but do *not* provide answers (and remember there are no right or wrong answers).
 - Encourage youth to think about what they are observing (reflection).
 - Visit each team often for about 60 seconds at a time (see *NPASS2* in *Resources* below).
- 4. Provide opportunities for youth to come together as a learning community. Break often (for about 5 minutes) away from projects/materials, to discuss what is working, what isn't working, and what they have observed. Record observations on a flipchart or whiteboard do not judge or screen input. Allow youth to discover

"answers" collectively as a group (see NPASS2 in Resources below).

- 5. Provide closure to the activity. The final discussion (away from projects/materials) should provide a summary of the session's findings, unresolved challenges, etc. Congratulate youth on successes, and give them an exciting preview of the next session. Wrap-up early if necessary to ensure youth have time to process the activity before leaving (see *NPASS2* in Resources below).
- 6. Let youth create science words. It is not important to focus on science vocabulary. It is much more important for youth to discover/observe what is happening than to have the "right" word for it.
- 7. Encourage the "opt outs" and "don't wanna's." Encourage participation and look for behaviors to praise to build confidence. Give youth an opportunity to warm up to the idea, and be particularly sensitive to developmental stages when deciding how best to address the difficulty.
 - Focus on building a safe and supportive environment for all participants so they can have confidence in trying new things.
 - Adopt an "always try" code of conduct, which challenges youth to make an effort even when afraid of failing.
- 8. Leave extra materials (afterschool and summer programs). Leave enough extra materials so afterschool and summer program staff can allow youth to do additional experiments between sessions.

Case Studies

Arnett – Facilitating Outdoor Exploration at Adventure Central. Adventure Central program staff noticed the connections between inquiry based and experiential learning a couple of years ago, and have been working on increasing the intentional inclusion of those methods into the program. Staff development sessions have been conducted around inquiry based learning to introduce the concept. The sessions included a tactic for lesson plans to incorporate at least one inquiry based learning activity per week. The focus is on having the inquiry based learning activity occur in an outdoor environment, which takes advantage of the program's unique setting within a 60-acre park. Group leaders present to the larger staff group what they did for their inquiry based learning activity at weekly staff meetings and include observations and key questions shared by the youth. Staff development is offered at least twice per year on inquiry based learning, and informal sessions are held throughout the year to include staff hikes, creek exploration, and assorted nature play.

Each day, time is set aside for youth to choose what kind of activity they want to pursue, and the vast majority consistently choose to go outside. Younger youth (ages 6-10) spend considerable time exploring the area by digging, catching insects, building structures, and engaging in imaginative play. The program encourages discovery by ensuring there are sufficient tools and materials available for youth to engage in the discovery process. Program staff interact with youth and ask questions or provide prompts as needed, but typically play more of an observer role, monitoring for safety and inclusion and letting the youth take the lead in their personal education process. When an interesting discovery is made, youth often seek out a reference resource to learn more, or work as a group to share knowledge on the subject. **–Nate Arnett, The Ohio State University**

Bird – From Answer-Giving to Question-Asking: Breaking the Habits of Direct Instruction. This has been the most challenging element of bringing truly high-quality science experiences to youth. The concept that science is about the process of discovery – and just how to make that happen – is difficult for most people to grasp. The common need to assure youth have the "right answers" leads to "telling" more than quality facilitating. This is especially apparent when training afterschool program staff, and when teens are learning to present the 4-H YES



curriculum (far too often they are modeling how science is taught in schools). Fortunately, the YES curriculum is inquiry based and, if followed, guides the facilitator in question-asking as opposed to answer-giving. Teens who facilitate YES are taught the processes of science for primary-aged children and see, during training, how these elements happen in the activities they present. When using other science curricula it is much more difficult to help teen – and adult teachers – understand inquiry based science. As part of the On the Wild Side training we deliver a session on the difference between directive instruction and non-directive instruction. –Marianne Bird, University of California

Resources

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support their 4-H Science programs. Includes a section on *Experiential and Inquiry-Based Methods in 4-H Science and Inquiry-Theory to Practice*. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Exploratorium's Institute for Inquiry[®] – workshops and facilitator guides (free downloads) for those providing professional development in the pedagogy and practice of science inquiry. Available at <u>http://www.explorato-rium.edu/ifi/workshops/index.html</u>. Introductory information on science inquiry is available at <u>http://www.exploratorium.edu/ifi/about/philosophy.html</u> - including free downloads of *What is Inquiry, Pathways to Learning, Inquiry Structure,* and *Inquiry Descriptions*.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>.

Providing Youth Authentic Opportunities to Practice and Share 4-H Science Abilities

Introduction

Excellent 4-H Science programs provide youth with authentic opportunities to practice and share new knowledge, skills, and abilities. Authentic quite simply means "real" – youth are engaged in finding solutions to "real" world problems and issues. Authentic opportunities to practice and share newly acquired 4-H Science Abilities (see 4-H Science 101 in Resources below) increase youth understanding of how science is relevant "in real life," often through "ah-ha" moments of discovery or reflection.

Providing authentic opportunities to practice and share 4-H Science Abilities helps youth:

- 1. Master new science abilities as well as other skills such as working in groups and public presentations;
- 2. Cultivate independence, as using science tools and abilities to address *current* problems helps them to envision themselves as *future* scientists;
- 3. Develop a sense of belonging as they work with like-minded peers, science professionals, and other members of the science community; and
- 4. Learn to share a spirit of generosity by addressing community issues and needs using science and technology.

The purpose of this chapter is to help program planners identify and include authentic opportunities for youth to practice and share *4-H Science Abilities*.

Promising Practices

The promising practices for Authentic Opportunities to Practice and Share 4-H Science Abilities are subdivided into five categories: (a) Program Planning and Evaluation, (b) Program Implementation, (c) Mastering 4-H Science Abilities, (d) Service-Learning and Community Involvement, and (e) Teaching and Presentations.

Program Planning and Evaluation

- Read the chapter <u>4-H Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to providing youth authentic opportunities to practice and share 4-H Science Abilities.
- 2. Develop relevant programs. Design programs that will meet the needs and interests of urban youth. Relate activities to community and world issues using emerging technologies as a hook for engaging youth (see also 4-H Program Design 4-H Science Checklist).
- 3. Use experiential, developmentally appropriate research-based curricula that support the science inquiry process. Refer to <u>Inquiry Based Learning Approaches</u> for more information.
- 4. Make science fun and interactive. Ensure youth have the opportunity to touch and try out as many sciencerelated tools as possible (microscopes, telescopes, lab equipment, robots, GPS/GIS units, etc). Remind the





youth that these "tools" are more like "toys" in the hands of the scientists who use them – in the same way that for scientists – "work" is like "play" because they enjoy what they are doing!

- *5. Recognize that youth can be scientists today.* Plan activities that allow youth to "be" scientists today, and to see themselves as scientists tomorrow.
 - Youth should use "real" tools and instruments and engage in "real" projects (e.g., water quality monitoring, GPS/GIS community mapping, etc.). Create a program name that includes the word "scientist."
 - Use appropriate titles for the roles that group members will undertake (e.g., engineer, project manager, recorder, reporter, technician, materials coordinator, etc.). Ensure each group member has the opportunity to experience each activity and role.
- 6. Include field trips to support learning objectives. Youth interest and knowledge can be easily increased with the right field trips. Field trips should allow youth to do more than just tour the facilities (passive participation). Incorporate a project, activity, or shadowing/job experience that will allow youth to be more active and engaged in their learning.
- 7. *Provide opportunities to expose youth to a variety of science careers.* Guest speakers and university-based science camps are two great ways to showcase the variety of careers available in the sciences.
- 8. Include entrepreneurial projects where appropriate. Entrepreneurial projects that make the learning real and connect to the community, such as marketing plants produced through a hydroponics program, are ideal for moving youth beyond what they just learned to "how is this applicable?"
- 9. Create issue, project, or theme based camp experiences. Allow youth to select an issue or challenge at the start of the camp week. During the week they will research the problem and design a solution. On the last day of camp youth will present their projects and findings (see *Mullens* in *Case Studies* below).

Program Implementation

- 1. Conduct orientation before and include reflection time after science projects. <u>Orientation</u>: Before the program, let youth know what they'll be doing and why. <u>Reflection</u>: After the project, bring the entire group back together to discuss. Ensure adequate time for reflection and self exploration.
- 2. Allow youth to work in small groups. 4-H Science programs deliver informal science education within the context of positive youth development. Youth will be working in groups of one kind or another for the rest of their lives. Science is practiced in interdisciplinary, multi-organizational, and/or multinational teams. Working in small groups allows youth to develop mastery of team skills needed for the future.
- *3. Strive for the lowest facilitator-to-youth ratio possible.* To allow for maximum hands-on participation, include as many adult or teen facilitators per youth as possible.
- 4. Incorporate the use of science journals. Youth can use journals to record scientific observations and data, but perhaps most importantly, youth can record reflections and "ah-ha" moments. This may work particularly well for young women who are more comfortable with private reflection than sharing in groups. It is very important to provide personal feedback to youth through their journals.
- 5. *Give youth a science challenge, or make the activity a contest.* Presenting youth with a problem or challenge to be solved helps get them started, especially if this is the first time for the process. Contests raise the fun quotient! Provide simple incentives.

View Our #Environmentell World #Environmentell By: Kara, Dominique, Khalid & Bryan WHAT W

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4-H Science Core Principles and Program Design



Mastering 4-H Science Abilities

- 1. *Provide opportunities for practice, repetition and problem-solving.* The more youth practice, the more confident they will feel in their abilities.
- 2. Hold skillathons regularly. They are a great way for youth to practice science abilities and will also motivate youth if they include some kind of competition.
- 3. Extend the learning to the home. Use curricula that provide opportunities for youth to share at home what they learned in the program. Provide take-home challenges that encourage practice in order to continue the learning process. Also provide parents with follow-up questions to ask the youth.

Service-Learning and Community Involvement

- 1. Include service-learning projects. Service-learning projects tied to real community needs (issue-based programming) are great opportunities to make the learning real and connect to the community. In addition, service projects move youth beyond being *future* change agents to being change agents today!
- 2. Engage youth in citizen-scientist opportunities. Citizen-scientist programs exist in many science fields. Youth collect and report their data online (e.g., wildlife inventory, precipitation, migration patterns, etc.) along with people from across the state, region, country, or even the world. These data are compiled and used by the appropriate scientific agencies or organizations to discover regional, national and/or worldwide patterns and trends (see several examples in *Resources* below).
- 3. Provide opportunities for youth to design and implement personal research projects. Connect them to science mentors (e.g., community scientists, university scientists, etc.) who are willing to provide assistance and direction through project completion.

Teaching and Presentations

- 1. Arrange for youth to present service-learning project results. If youth have worked on addressing authentic community needs, there will be built-in audiences for project presentations among appropriate government, civic, and/or environmental agencies and organizations.
- 2. Provide opportunities for youth to facilitate and teach. To complete the learning cycle, help youth share their abilities and what they have learned with others. Engage youth as teachers. Being exposed to information is very different from being expected to teach it to others. Possible audiences include younger youth, peers, parents, community groups, and so forth.
- 3. Be alert for presentation opportunities. The more authentic opportunities youth have to present their projects and findings, the more competent they will feel in their knowledge *and* presentation skills. Possible venues include:
 - Community events (e.g., Recycling Awareness Day, Earth Day, science fairs, etc.);
 - Conferences (e.g., youth, school, professional, etc.); and
 - Government agencies, science professionals, and other interested community members.

Case Studies

Moon – Developing 4-H Science Abilities Through Robotics. In 2004, 4-H started a partnership with the 21st Century Community Learning Centers administered by the Local Investment Commission of Kansas City. This partnership led to 4-H Afterschool robotics project clubs in elementary schools and expanded into collaborations with two high school FIRST® Robotics teams. The majority of afterschool staff at the LINC sites have limited post-secondary education with little to no experience in providing science based programs to the afterschool youth. The 4-H afterschool programs are focused on schools with high populations of youth who are underrepresented in STEM fields. The majority of the programs were concentrated in the elementary grades until the last two years. This year, clubs were organized in the Hickman Mills and Independence middle schools and the Lincoln Prep high school. The Independence 4-H Robotics Club competed in the FIRST[®] Lego League program and the two high schools each have FIRST[®] Robotics teams. The primary goals of the 4-H robotics program are threefold: (a) to provide a structure for providing youth with project based experiential learning opportunities in career areas with strong opportunities, (b) to improve the academic success of inner city youth in science related subject areas, and (c) to establish a support system that will prepare previously underperforming youth to compete for educational opportunities in middle school, high school, and college. The afterschool programs provide Lego League based programs two to three afternoons a week to youth in afterschool programs in the Kansas City metropolitan area. Summer programs feature "camps" for robotics and GPS which feature the 4-H curricula developed by 4-H (Nebraska GEARTECH) and/or programs based on the Lego League training from the Carnegie Mellon summer institutes. The summer programs have allowed 4-H to expand to partnerships outside of the afterschool programs of the school year. The primary partner is The Local Investment Commission of Kansas City. We are also major partners of the FIRST[®] Lego League and FIRST[®] Robotics efforts through the University of Missouri Kansas City and Kauffman Foundation. -Leon Moon, University of Missouri

Mullens – Youth Wetlands Project Provides Service-Learning Opportunities. The Youth Wetlands Project is a statewide program created to provide science based hands-on activities and educational supplies at no cost to educators. Program curriculum is developed to help youth gain an understanding of the functions and values of wetlands and explore strategies for sustaining these unique ecosystems. Participating educators are encouraged to teach the lessons from the curriculum manual and conduct restoration projects and service-learning activities in their community. Program materials include structured lesson plans, materials used to teach lessons, and step-by-step procedures to activities. The program curriculum is endorsed by the Louisiana Science Teachers Association and lessons are designed to follow Louisiana's Grade Level Expectations (GLE's). Pre- and post-tests are completed by youth, and the results reflect increased knowledge of main science concepts.

Opportunities to participate in wetland restoration projects are available to teachers and youth throughout the year in various locations across the state. Participating youth have helped with vegetative plantings, tree plantings, and invasive species removals; constructed and installed wood duck boxes; and assisted in trash bashes/ beach sweeps. During the summer months, youth are encouraged to attend four summer camps that utilize program curriculum and provide wetland-related, hands-on learning activities: (a) 4-H Camp Grant Walker, (b) Louisiana Outdoor Science and Technology (LOST) Camp, (c) Marsh Maneuvers, and (d) Wild Woods Wanderings. **–Ashley Mullens, Louisiana State University**

Warner – Application of Science to Entrepreneurial Ventures in the Community. Building on over 20 years of research in hydroponics, Cornell University Cooperative Extension, NYC (CUCE-NYC), in collaboration with Cornell University partners, developed *Grow with the Flow* curriculum, a hydroponic gardening project. This curriculum, together with its leader's guide, outlines a hands-on, science based program targeted to 4-H, afterschool, and summer youth that integrates multiple science disciplines into a comprehensive model that uses innovative, ex-





periential activities to teach science and its application to the real world. The process of designing and building a hydroponics system and growing, harvesting, and selling produce to NYC markets provides youth with inquirybased, hands-on experiences. Topics covered include plant biology, sustainable agriculture, environmental and earth sciences, chemistry, physics, mathematics, ecology, computer science, marketing, economics, as well as the social implications of science and technology in real world settings. The *Grow with the Flow* curriculum addresses many standards in science education recommended by the American Association for the Advancement of Science (AAAS), the National Research Council (NRC), and the New York State Education Department. **–Philson Warner, Cornell University**

Resources

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery, and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Service Learning Curriculum – sites includes information about the curriculum, additional resources, and a link to purchase the three-book service-learning series. Available at <u>http://new.4-hcurriculum.org/projects/ser-vicelearning/</u>.

4-H There's No New Water! Curriculum Page – includes information and additional resources on service-learning and Youth-Adult Partnerships. Available at <u>http://www.4-h.org/resource-library/curriculum/4-h-theres-no-new-water/service-learning/</u>.

Citizen Scientist Opportunities – the following websites are representative of the increasing opportunities for youth and others to participate as citizen scientists – recording and sharing data with the greater scientific community. A database of Citizen Scientist opportunities, searchable by subject, is available at <u>http://scienceforciti-zens.net/</u>.

Community Collaborative Rain, Hail and Snow Network - http://cocorahs.org/.

Cornell Lab of Ornithology - <u>http://www.birds.cornell.edu/citsci/</u>.

NASA Science - http://science.nasa.gov/citizen-scientists/.

Project BudBurst - http://www.neoninc.org/budburst/index.php.

National Service-Learning Clearinghouse – a wealth of information and resources on service-learning and exemplary service-learning programs. Includes professional development (conferences and webinars) and grant opportunities. Available at <u>http://www.servicelearning.org/</u>. A site designed for youth is available at <u>http://www. servicelearning.org/youthsite</u>.

School Gardening: Best Practices – a guide developed as part of the Louisiana 4-H Seeds of Service School Gardening Program with suggested practices for starting and maintaining youth gardening programs. Available at <u>http://www.ext.colostate.edu/4_h/school-garden.pdf</u>.

Training Others to Deliver High Quality Science Programming

Introduction

It is quite likely that the most under-appreciated component of high quality 4-H Science programming is staff and volunteer training. Program planners and frontline staff usually have high hopes for program success, but are often disappointed when outcomes do not match expectations. The culprit may not be in the program's design, but in the lack of adequate preparation for those anxiously engaged in program delivery! This can be easily remedied by developing training *programs* with the same care and attention to detail that goes into the program planning process.

Perhaps the most important reason to develop a high quality training program is to ensure *fidelity of implementation*. Fidelity of implementation refers to how well program delivery corresponds to the ideal envisioned by the program planner (or curriculum author). Solo 4-H agents or educators cannot possibly reach the large numbers of youth in urban areas by themselves, so they must rely heavily on staff and volunteers. This is when fidelity of implementation becomes important. It is a fairly simple matter for a single 4-H professional to deliver programs in a similar manner across various venues and audiences – but another matter entirely when several people are responsible for program delivery. In addition, the sheer diversity of potential facilitators (e.g., 4-H colleagues/ peers, associate staff, contracted staff, content rich volunteers, teenagers, collaborating afterschool and summer staff, community volunteers, etc.) virtually guarantees there will be differences in implementation!

The key, therefore is to provide training that will help program staff and volunteers implement content-rich, developmentally appropriate science programs in a similar manner across facilitators, audiences and venues. In the service of fidelity of implementation, it is important to mention that one-shot training does NOT work. To reiterate, *one-shot training does not work!* It is critically important to fidelity of implementation, *as well as* youth outcomes, that a training program provide the continuous, ongoing support program staff, volunteers *and youth* need for success.

The purpose of this chapter is to detail promising practices for training others to deliver high quality science programming. There are, however a few training practices worth emphasizing at this point:

- 1. Make it fun future facilitators will model what they see!
- 2. Use an experiential, inquiry based approach future facilitators will model what they see!
- 3. Limit the use of scientific terminology future facilitators will model what they see!
- 4. Focus on science *processes* future facilitators *will* model what they see!

Promising Practices

The promising practices for *Training Others to Deliver High Quality Science Programming* are subdivided into three categories: (a) Program Planning – Professional Development Opportunities, (b) Program Delivery – Professional Development Opportunities, and (c) Supporting and Recognizing Program Staff and Volunteers.





Program Planning – Professional Development Opportunities

In the Beginning

- 1. Commit to providing program staff and volunteers with the continuous support and opportunities for professional development required to sustain quality 4-H Science programs. Recognize from the start that the level of program success will be directly related to the level of support provided to frontline staff and volunteers.
- 2. Ensure that staff and volunteers are well trained. Program staff and volunteers need to feel comfortable with all aspects of providing 4-H Science programs content and context.
 - Providing on-going (over time), comprehensive (content- and context rich) professional development opportunities is critical to 4-H Science program success.
 - This may be especially true in an urban program where new staff may not have been exposed to positive youth development programs or principles.
- 3. Meet program staff and volunteers where they are. Program staff/volunteers will have varying levels of experience and skills. They may have very little experience (or perhaps a negative experience) with science and may well have anxiety about delivering science curricula.
- 4. Complete the "4-H Science Needs Pre-Assessment." Program staff and volunteers should also complete the instrument. This assessment will reveal personal and organizational strengths and challenges to implementing 4-H Science programs (see 4-H Science 101 in Resources below).
- 5. Encourage program staff and volunteers to complete the "4-H Science Competency Self-Assessment." This tool will help improve 4-H Science program delivery and aid in staff development (see 4-H Science 101 in Resources below).
 - This assessment will reveal strengths in and challenges to implementing the core competencies.
 - Review results individually with staff/volunteers and help them set personal goals.
 - Develop training modules based upon overall results to address opportunities for improvement.
- 6. Plan quality, professional training. Components to include in trainings will be discussed in more detail (see *What to Include in Trainings* below). Often people equate quality with a "professional" look and feel. The following tips will aid in increasing the professionalism of trainings:
 - Request pre-registration. Assign someone to staff a sign-in table the day(s) of the training to check people in, hand out name badges and packets, and answer any questions. Materials should be displayed in an orderly manner, and the table should be manned at least 30 minutes prior to program start.
 - Provide information packets (folders) for participants to use during the training (agenda, worksheets, note paper), and include any take-home hand-outs, supply lists, directions, and so forth.
 - Use printed name badges and have certificates of completion for each participant.
 - Create appealing collateral materials (flyers, forms, agendas, hand-outs, etc.) that shout "professional!" Use white space for emphasis. Eliminate the use of clip art and word art. Use high quality, 21st century graphic images.



- Begin and end on time. Begin and end on time. Begin and end on time!
- Provide (and follow) an agenda. It is not necessary to provide times (other than start and end). This allows trainers to "go with the flow" according to audience needs.
- Bring at least one assistant whenever possible. This will depend upon the size and scope of the training. Multiday functions that include refreshments and meals will require at least two assistants, one to coordinate food service and one to assist in the training. It is better to arrive over-staffed than under-staffed!
- 7. Adopt (or adapt) the National Partnerships for After School Science (NPASS) model for training 4-H Science program facilitators. This model provides outstanding support for facilitating inquiry based learning activities (see NPASS in Resources below).
- 8. Subsidize professional development opportunities. Use grant or other soft monies whenever possible to subsidize at least part of the cost of the training (e.g., 2-day institutes, full-day trainings, in-services, workshops, etc.). Prospective trainees may or may not have the funds for a 100% fee-based model. The goal is to reduce barriers to entry as much as possible in order to increase the quality of 4-H Science programs as well as the number of youth served.

What to Include in Trainings

9. Include the following topics in the initial, as well as on-going trainings. These topics have been identified as "critical" for supporting program staff and volunteers prior to and during program implementation. Topics focus on delivering science *content* in the appropriate positive youth development *context*. This is what sets 4-H Science apart from other formal or informal science education activities!

Critical Training Topics

Th	ese topics are important regardless of staff/volunteer background and/or experience.	Content	Context
a)	Inquiry based learning (4-H Science Checklist)		2
b)	Experiential learning model (4-H Science Checklist)		2
c)	4-H Science Abilities (4-H Science Checklist)		
d)	4-H Science Checklist*		
e)	4-H Science Logic Model* (include program assessment/evaluation)		X
f)	4-H Science Core Competencies (Essential Elements of 4-H Youth Development)*		
g)	Program curriculum (project kits, materials, tools, etc.)		
h)	Ages and stages (developmentally appropriate practices)		2
i)	Group management		₽
	*See 4-H Science 101		

- Inquiry based learning: Most program facilitators, regardless of background, will need training to support a) the inquiry based learning approach. It is crucial that they understand and become comfortable with the process of facilitating inquiry (as opposed to merely transferring information) (see chapter on Inquiry Based Learning Approaches and the 4-H Science Professional Development Toolkit in Resources below).
- b) Experiential learning model: While an inquiry based approach does include components of experiential learning, it does not specifically address application and community engagement (see the 4-H Science Professional Development Toolkit in Resources below).
- 4-H Science Abilities: These abilities are included in the 4-H Science Checklist. Exposure to and mastery c) of these abilities is important for increasing foundational science skills (see 4-H Science Program Design - 4-H Program Checklist).
- 4-H Science Checklist: The checklist outlines seven components of "Science Ready" programs. Staff and d) volunteers should use the checklist periodically as a self-check for program implementation (see also Appendix I – Make a Better Pinwheel: Review and Share in 4-H Science 101 in Resources below).
- 4-H Science Logic Model: Break the model down into bite-sized sections so as not to overwhelm trainees. e) Focus especially on outcomes (see 4-H Science 101 in Resources below).
- 4-H Science Core Competencies: Ideally, the 4-H Science Core Competencies Self-Assessment was completed in advance of planning initial trainings. During trainings, focus upon areas that need strengthening. Administer subsequent assessments as part of on-going trainings so trainees can track their development. Include ideas on how to strengthen/implement competency areas (see 4-H Science 101 in Resources below).
- Program curriculum: Modeling the correct use of program curriculum is imperative. When planning the g) trainings, plan to facilitate lessons/activities the way they should be implemented with a youth audience (for more information see Program Delivery – Professional Development below). Also demonstrate the appropriate use of project kits, materials, tools, and so forth.
- Ages and stages: Most staff/volunteers will benefit from at least a refresher course on developmentally h) appropriate practices. Do not assume, however that people who are already involved with youth (associated with education or youth serving organizations) are familiar with developmentally appropriate practices. If using teen/adult facilitator teams, consider including Youth as Partners training as well.
- i) Group management: This is especially useful for people who are not comfortable with facilitating or working with more than a couple of youth at any one time.
- 10. Include video vignettes of program facilitators in action. Allow time for trainees to discuss/critique what does or does not work in the video. The facilitators in the videos should not be known to the current audience - if necessary arrange to borrow video from colleagues in other counties or states.
- 11. Include opportunities for trainees to facilitate an activity or project as part of the training. This is also known as a "teach back." This would be done on the second day of an initial two-day training, or at any time in subsequent trainings.
- 12. Include opportunities to discuss and process different presentation and facilitation methods. This is guite



helpful, so trainees can understand the differences between lecture, demonstration, guided inquiry, and open inquiry. Use the learning module in the *4-H Science Professional Development Toolkit* (see *Resources* below).

13. Include time for reflection. Trainees will need time to process everything they are learning. Be sure to include ample time for discussion and reflection throughout the training. Allowing the trainees time to reflect will help them remember to do the same when they facilitate the programs with youth.

Frequency and Timing

- 14. Provide regular professional development opportunities for facilitators. Periodic in-service trainings for new and experienced facilitators are very helpful to their success, and to maintaining fidelity of implementation. Conduct multiple sessions and include learning activities to support content and context. Encourage experienced facilitators to assist in the trainings. Regular trainings:
 - Allow program staff and volunteers to build partnerships and relationships with each other and the trainer(s).
 - Provide on-going opportunities for feedback, problem-solving, encouragement, praise, and support. (see also *Personal and Resource Support for Facilitators* below).
 - Facilitate development of a community of practice. Partnerships and relationships are built over multiple training sessions.
- 15. Plan multiday trainings. Do not be afraid to ask staff and volunteers to commit to a two-day (or longer) training, especially when launching a new program or working with new personnel. A two-day training allows for more reflection/processing time, and facilitates the inclusion of teach-backs as part of the professional development experience (see *Item #11* above).
- 16. Offer trainings to complement program implementation. Provide a once-a-month series of trainings to introduce multiple projects in a curriculum and to reinforce positive youth development (PYD) principles. This allows the facilitators to receive the training information and implement the projects over the following weeks. The training should cover the curriculum that will be used for that month, and facilitators should receive the corresponding materials kit at that time.

Program Delivery – Professional Development Opportunities

- 1. Include teens on your training team. Trainings are the perfect venue for modeling youth as partners and demonstrating team facilitation. This approach is especially effective for use in trainings that include new teen facilitators, as the new trainees get to see experienced peers in action (see also <u>Staffing with Teenagers</u> <u>and Teens as Cross-Age Teachers</u>).
- 2. Utilize experienced facilitators as trainers. Experienced facilitators bring a unique perspective to the trainings and can respond to specific questions with authority. They also offer tips for handling all types of situations that arise during program sessions.
- 3. Allow time to model a typical science activity or project. The importance of modeling inquiry as part of the training cannot be overstated. Trainees need to experience the process themselves to better understand how it looks and feels.
 - During the session, deliver activities from the curriculum as if facilitating to the youth audience.
 - Do not step out of character or narrate that process just do it! Teaching "tips" can be delivered at the end.





- Allowing facilitators to experience the project for themselves encourages the true excitement of learning.
- 4. Address the science fear factor. Perhaps the biggest fear prospective facilitators have regarding science programming is that they will "do" it incorrectly, or that they will not have the "right" answer. Reiterate that it is okay (even desirable) not to have all the answers the best facilitators do not provide answers they provide experiences! Focus staff/volunteers on the process of science discovery (inquiry), and on helping youth develop and practice 4-H Science Abilities.
- 5. Remind trainees often that they are "co-learners" with youth. Program staff/volunteers must be willing to explore and learn together with youth. This principle can be especially difficult for staff/volunteers coming from the formal education system. One way to circumvent the tendency for facilitators to want to provide answers (transfer of knowledge) is to engage youth in "real" community-based projects that do not yet have a solution (science discovery)!
- 6. Remind trainees that the goal is to help youth develop an interest in science and to begin thinking like scientists. It is much more important for youth to discover/observe what is happening, and process it in their own terms, than for them to be stifled because they do not know the correct scientific vocabulary. Encourage trainees to let youth make up their own science words to explain their observations (e.g., "uppy bit," law of conservation of "oomph," etc.).
- 7. Help facilitators see youth as scientists doing science. The use of appropriate, inquiry based curriculum will reinforce this concept, as will encouraging facilitators to provide youth with opportunities to engage in authentic tasks (e.g., GPS/GIS community mapping, water quality testing, etc.). Remind them that the youth are more likely to see themselves as scientists *today* if they are treated like scientists *today*!
- 8. Stress the importance of the teaching environment when delivering informal science education. Learner understanding and comprehension will increase if youth are physically and emotionally comfortable in the educational setting. Advise facilitators to choose activities and teaching strategies that complement both the setting (e.g., indoor or outdoor, tables and chairs or just chairs, morning or evening, etc.) and the relationships (e.g., familiar with each other or not, mandated to be present or voluntary, etc.).
- 9. Remind facilitators it is okay **not** to complete all activities during a session. Again, the focus is on the processes, not the activities. Facilitators should allow ample time during and after the activity for youth to explore, ask questions, share thoughts and information, reflect, and so forth (see also *Item #3* under *Program Planning and Evaluation* in *Inquiry Based Learning Approaches*).

Supporting and Recognizing Program Staff and Volunteers

- 1. Build relationships with program staff and volunteers. A connection with those who are delivering the program means they are more likely to ask for assistance when help is needed. A personal knowledge of program staff/volunteer needs will help inform the kinds of support and professional development opportunities provided to them.
 - Be positive and affirming. Provide lots of encouragement. Reiterate *Item #4* under *Program Delivery Professional Development Opportunities* above.
 - Remind staff/volunteers periodically of the benefits of their contributions. All volunteers are vital, however some may not realize how much their input makes a difference.
- 2. Allow new facilitators to progress from trainee to trainer over time. Ideally, a model training program will



allow facilitators to develop their skills in a structured, supportive environment.

- Following initial orientation and training, a new facilitator should attend a program session as a participant-observer.
- After the new facilitator has attended the program as a participant, she/he should be teamed with an experienced facilitator to co-facilitate a program session (see also *Item #3* below).
- After the new facilitator has co-facilitated a program session, he/she leads his/her own program session.
- As the final step in the process, the not-so-new facilitator is ready to train others in future training sessions, and co-facilitate with or mentor new facilitators (see *Enfield* in the *Case Studies* below).
- 3. Partner new and inexperienced facilitators with experienced facilitators. This has proven to be an excellent method for further "on-the-ground" training of new facilitators. Experienced facilitators act as role models and mentors. This pairing lessens anxiety in general, and helps to effectively deal with questions from program participants. The seasoned facilitator may also help assess whether the new trainee is on the right track and can intervene early to help extinguish unwanted habits, while fostering positive techniques.
- 4. Follow-up coaching and "checking-in" is important. Periodically meet with facilitators to ascertain how they are faring, and to review curriculum and activities with them. Facilitators should not be left on their own for long periods of time without staff contact.
 - Conduct field observations, and provide facilitators with feedback regarding inquiry based learning effectiveness.
 - Use an observation tool (e.g., *NPASS2 Afterschool Site Observation Form*, see *Resources* below) in order to provide specific feedback and support.
- 5. Provide opportunities for inexperienced staff and volunteers to shadow experienced staff facilitating a program. People model what they see, so if at all possible find ways to incorporate shadowing into a comprehensive training program.
- 6. Create a learning community to support program facilitators. Foster sharing among facilitators. Provide them with adequate opportunities to practice teaching each other for immediate feedback. Use technology (e.g., e-mail, blogs, conference calls, etc.) to cut down on travel expenses of learning community members, and help them become immediately accessible to each other for support and problem-solving around programming issues.
- 7. Provide access to appropriate 4-H Science and inquiry based learning resources. Sometimes program facilitators may need/want additional materials to support the curriculum provided. Help them locate high quality resources based on the program's educational goals. Ensure the facilitator understands how to effectively use these resources "as is" or adapt them to meet their specific program needs.
- 8. Provide materials kits at the training, along with lists for consumable items. This will reduce a major barrier to implementation, as staff and volunteer facilitators may or may not have the time or the resources to pull together materials needed for program implementation. Providing the same materials to all facilitators also increases chances for fidelity of implementation. Instruction for using the kits should be covered in the trainings. Use inexpensive and readily available materials to keep costs to the implementation sites at a minimum.
- 9. Recognize successes within a reasonable timeframe after program completion. Assess the impact of a program shortly after program completion to show those involved the effects of their contribution(s).
 - A small recognition should be immediate and informal to provide some needed feedback.
 - Many programs have an annual or bi-annual volunteer awards ceremony which makes for a nicer event, but this may delay recognition.
 - Provide recognition to program/collaborating staff by including them in award nominations, program showcases, press releases, and so forth.
- 10. Recognize and reward program volunteers regardless of the type of service. All volunteers should receive the year pins and certificates that traditional 4-H volunteers (club leaders) receive and should be honored at the annual 4-H Achievement Night for service years. They should also be eligible for all other forms of recognition and incentives offered to 4-H volunteer leaders and facilitators (e.g., scholarships to attend 4-H Conferences, invitations to co-present at meetings and national conferences, nominations for State and National Leader Awards, profiles in the local media for their contributions to youth and families, etc.).

Case Studies

Bird – Increasing Staff and Volunteer Confidence and Competence for Success. Each year 4-H trains roughly 30 to 60 teens and adult coaches in the 4-H Youth Experiences in Science (YES) Program, 25-35 teens and adults as 4-H On the Wild Side staff, and 20 Sacramento START program leaders in the 4-H Water Wizards Program. Trainings contain a variety of elements. All include material on inquiry based teaching and the processes involved in doing science. For YES and On the Wild Side, teens and adults learn about working with youth. When projects require teens and adults to work together, sometimes they are also trained in youth-adult partnerships.

In all instances, the trainings are hands-on. Participants learn through activities, discussion, experiencing concepts (like the processes in science), and demonstrating what they'll be teaching to youth. PowerPoint is never used! Science is about doing, so that kind of teaching is modeled. Some trainees have negative feelings about science. Some are scared or unsure that they are capable of teaching it. Some people are overconfident and lack background in how and what to present. Science does not feel accessible for some; it's seen as something complex. In order to reach urban populations, trainees need to see that they can, indeed, do science, that it requires nothing more than a mindset, and that it can be enjoyable. Training evaluations and observations indicate success in helping participants come away from the trainings with three things. First, participants better understand the process of science. Secondly, they feel more secure in the content area they'll be teaching. And thirdly, they feel a sense of confidence and enjoyment in the teaching process.

Edwards - Building Capacity for 4-H Afterschool Success. Jackson County 4-H Afterschool is focused on program delivery through contracted staff members and volunteers. The largest program efforts are under contract with the Local Investment Commission (LINC), the major provider for afterschool programs in the Kansas City area. This contract is funded through a 21st Century Community Learning Center grant – providing funding for six 4-H associate staff members to deliver informal education programs at 11 afterschool sites (reaching 600 afterschool 4-H members). 4-H also provides leadership for training and implementation of 4-H Science for these and other sites. Successful trainings have included multiple delivery methods. Baseline trainings are provided in the area of positive youth development. In 2010, with support from the National 4-H Council and MetLife Foundation 170 afterschool providers from 11 school districts attended a day-long Power UP! Your After School Professional Development Institute. Power UP! sessions primarily fall into three areas: (a) informal science education principles, (b) positive youth development, and (c) project based learning (including Aerospace, GPS/GIS, and NPASS2 cur-



ricula). The monthly training schedule includes Great Science for Girls (12 hours), NPASS2 (9 monthly - 3 hour sessions), 4-H Wonderwise, and Afterschool Universe (8 hours). "Learn by doing" facilitation, conducive scheduling, and certified training hours are keys to Jackson County 4-H Afterschool training success. **-Beth Rasa, University of Missouri**

Enfield – Progressive Responsibility and Peer Support for 4-H Science Facilitators. All 4-H SLO SCIENTISTS facilitators participate in hands-on orientation and training that reinforces the key components of the 4-H SLO SCIENTISTS instructional model and the use of 4-H SLO SCIENTISTS materials. A goal of the facilitator training is to enhance fidelity to SLO SCIENTISTS principles of constructivist education used by inquiring youth/adult teams in the numerous hands-on inquiry based experiences, as well as how this all fits together in a framework of positive youth development. It is critical to train potential facilitators in inquiry based learning before they begin facilitating their first SLO SCIENTISTS session. The training session needs to model inquiry learning approaches, offer numerous opportunities for hands-on practice with activities, and include ample time for reflection. Questioning techniques, including open-ended vs. closed questions, is also important to address in the initial training.

Training strategies include regular opportunities for reflection and improvement. In addition, peer-facilitator assistance helps to further reinforce fidelity to the model. After initial orientation and training, facilitators first attend 4-H SLO SCIENTISTS sessions as participant observers, then assist experienced facilitators with sessions, then lead their own 4-H SLO SCIENTISTS sessions with experienced facilitators assisting them, and finally lead their own group sessions of 4-H SLO SCIENTISTS. Reflection and mentoring to improve skills and ensure the incorporation of positive youth development concepts is an ongoing process throughout each step of the training model. This allows the facilitators to have the experience of learning by doing through their own continuity, interaction, and reflection. This training strategy, employed from the start of the 4-H SLO SCIENTISTS program, has shown itself to be very effective in preparing volunteers for service as 4-H SLO SCIENTISTS facilitators. **-Richard Enfield, University of California**

Warner – Multiday Training, Ongoing Technical Assistance, and Site Visits. Cornell University Cooperative Extension 4-H in NYC in partnership with the New York City Department of Youth and Community Development (NYCDYCD), Cornerstone Hydroponics Science Education Food Production After School and Summer Program trains the two Cornerstone Project staff from each of the 25 Cornerstone sites throughout NYC's five boroughs, in the *Grow with the Flow* curriculum for three full days. This 24-hour core training is supplemented by technical assistance during the winter, spring, and summer during implementation, and is supplemented by observations and on-site coaching. Participation in the three-day training is critical to the program's success. Each of the ten sessions includes background information for group leaders/educators and activities for youth. This information, presented in a concise and easily understood manner, serves two purposes: (a) it helps clarify the facilitator's understanding of the scientific principles, and (b) it can be used as an outline for teaching young people. Youth are provided with seeds to grow edible crops such as basil, Chinese cabbage, and lettuce, while exploring fundamental concepts in applied and biological sciences, technology, and environmental studies.

The *Grow with the Flow* curriculum can be supplemented and expanded with curriculum elements from the larger Hydroponics Learning Model. The Hydroponics Learning Model curriculum consists of over 30 sessions that help the facilitator and youth design, implement, and monitor nutrient drip flow technique (NDFT) hydroponics systems such as that explored in the *Grow with the Flow* program. **-Philson Warner, Cornell University**





Resources

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery, and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support their 4-H Science programs. Includes sections on the 4-H Science Checklist, 4-H Science Competencies, Experiential and Inquiry-Based Learning Methods in 4-H Science, Recruiting and Developing 4-H Science Content Rich Volunteers, Recruiting and Developing Traditional Volunteers in 4-H Science, Tools and Resources for 4-H Science Professional Development, and Communities of Practice. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Afterschool Training Toolkit - research-based practices, sample lessons, video examples, and resources to support academic enrichment in afterschool settings. Available at <u>http://www.sedl.org/afterschool/toolkits/index.html</u>.

Guide to Professional Development of Out-of-School Science Activity Leaders - the tools and articles provided here describe a model for how to engage out-of-school activity leaders in professional development around science and engineering activities for youth. Based on a successful NSF-funded program called the National Partnerships for AfterSchool Science (NPASS), it describes an approach to out-of-school programming where science is complementary to what happens in school, and the activities and projects used with youth are accessible to most program leaders. Available at <u>http://ltd.edc.org/resource-library/guide-professional-development-out-school-activity-leaders</u>.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>. The NPASS2 Afterschool Site Observation Form and a Science Trainer Reflection Form are available at <u>http://npass2.edc.org/forms-and-tools-data-collection-and-feedback</u>.

Overarching Principles for Sustainable Partnerships

Introduction

Creating partnerships with like-minded organizations can be richly rewarding for everyone involved. A solid partnership easily doubles (or more) the "sum of its parts." Strong partners share resources, complement or support each others' strengths or weaknesses, and see challenges as opportunities for growth. Sustainable 4-H Science partnerships have good communication networks, distribute rewards and recognition equitably, and ultimately are able to increase the number of youth reached with high quality, 4-H Science programs.

There are several critical "overarching principles" that apply to sustainable partnerships regardless of the type of partner organization (e.g., afterschool providers, universities, science centers, etc.). This section introduction discusses several principles that will enhance program partnership development and sustainability.

Overarching Principles

Sustainable partnerships start with self-reflection.

- Begin with the end in mind. Have a vision for where urban 4-H Science programming will be in 3-5 years, based upon statewide strategic planning documents as well as current and projected community needs. Be concrete in stating future programming goals (e.g., number of youth served, types of program offerings, venues, ideal partners, etc.). Commit to becoming (or remaining) a "4-H Science Ready Program" (see also <u>4-H</u> <u>Science Program Design – 4-H Science Checklist</u>).
- 2. Ascertain the informal science education needs (met and unmet) of youth in the community. Look at resources (human and material) that are available, or needed, to meet those needs. Assess organizational and community capacity to support science programming. Decide if forming a partnership is the most effective way to meet those needs.
- 3. Identify the appropriate niche for 4-H Science programs. The idea here is not to compete with other organizations, but to meet needs that are currently unmet.
- 4. Assess current programmatic strengths, opportunities, and challenges. Take inventory of the current state of 4-H Science programming. Know what is working, and why. Be aware of opportunities for creating new partnerships, acquiring funding, and so forth. Seek to discover the underlying causes of any challenges.
- 5. Know what is needed for successful 4-H Science programs. An accurate assessment of the resources 4-H is able to provide, as well as what the program needs, should guide negotiations with a potential partner. For example, if:
 - 4-H does not have the resources to staff a program, the partner can be asked to either allow their existing staff to take on that role or assist 4-H in recruiting and funding adequate staff to deliver the program.
 - Science equipment and supplies are an issue, partners need to work together to secure necessary materials.





- 6. Ascertain the roles suitable for 4-H before entering into a partnership. Think about what makes the most sense for 4-H regarding program roles and responsibilities. For example:
 - Will 4-H deliver programs directly, or train collaborating staff to deliver programs?
 - Does 4-H want to handle program enrollment, or is this task better suited to the collaborating partner.
 - Is 4-H responsible for pre-program site preparation and clean-up after the program, or does the site provider have staff available to assist?

Sustainable partnerships share a common vision and similar goals.

- Locate partners with a similar youth development philosophy and goals. Perform background research on
 potential partners. Partners with a similar youth development philosophy and goals are more likely to see
 how a shared vision and collaboration can be built. As preliminary partnering discussions are held, listen for
 language that relates to the eight Essential Elements of Positive Youth Development present in belonging,
 independence, mastery, and generosity (see also <u>4-H Science Program Design 4-H Science Checklist</u>).
- 2. Ensure potential partners understand that 4-H Science is informal science education delivered within a positive youth development framework. Emphasize that 4-H delivers quality programs (as opposed to activities), and as such will need support (including adequate time) to deliver a regular and ongoing series of educational sessions (see also <u>4-H Science Program Design 4-H Science Checklist</u>).
- 3. Strive to create a "true needs, true partners" relationship. Sustainable partnerships go beyond a letter of support for a grant; they are long-term relationships that complement each others' organizational goals to create stronger programming.
 - Determine upfront how each partner will benefit from the partnership. All partners need to understand the benefits to partnering with each other. Strive to create balanced partnerships in terms of what each partner brings to the table and the benefits reaped.
 - Complement each other's resources. Look for opportunities to partner with organizations that strengthen the 4-H Science program, or that have needed resources. For example, 4-H is strong in positive youth development (PYD), and a local science museum may have plenty of volunteers to facilitate youth programs, but they need PYD training.
 - Organizational parameters, expectations, and requirements of *all* parties involved must be considered to avoid turf struggles and issues. Achieve consensus on goals for all partners involved. Come to a joint understanding as to what constitutes partnership success as well as program success.
 - Break program implementation and evaluation processes into component parts. Discuss and agree upon the best roles for each partner (e.g., recruitment, location, program delivery, evaluation, etc.).
- 4. Know when to walk away. 4-H professionals need to be willing to abandon a potential partnering relationship if the partner's actions do not convey a shared philosophy, appropriate cultural beliefs, a willingness to properly recognize 4-H, or a collaborative spirit to meet all partners' needs.

Sustainable partnerships "put it in writing."

- 1. Create a Memorandum of Understanding (MOU). The importance of a written contract or MOU cannot be overstated. It is essential that potential partners begin by crafting a MOU that clearly states the intention, roles, cost sharing, and so forth of each organization. Do not forget to include evaluation responsibilities of each partner.
 - *Roles and Responsibilities.* The agreement should cover responsibilities of each partner, expectations and other issues that are important. These issues and agreements are best discussed before program implementation, so there is an agreement to refer to if issues arise after the program begins.
 - *Fiscal Issues*. Quite simply, the MOU should state who pays for what. Include cost-sharing, supplies, salaries, administrative overhead, and so forth. The agreement should identify the fiscal agent, and if payments are to be made to program partners, payment dates and amounts (and any reporting contingencies). If positions are to be shared, outline not only the cost of salary and benefits but office support and travel costs.
 - Co-Branding. As part of the MOU, both parties should agree on the level of recognition each partner will
 receive on respective publications, websites, and other media. Negotiation and compromise are keys to
 success when marketing 4-H Youth Development programs and branding options to potential partners.
 There is no question about whether the 4-H Emblem should be included on program materials, but do
 clarify how it should be used. Discuss including appropriate recognition of Extension and the land grant
 university. Reaching an acceptable marketing and branding relationship relative to program components,
 evaluation strategies, and reports to stakeholders makes it easier for partners to work side-by-side while
 still having their individual needs met (see also <u>Marketing and Branding 4-H in Urban Communities</u>).
 - Shared Resources. Quite often a community partner provides the majority of physical resources, especially facilities. Consider what resources 4-H and the land grant university might bring to support program efforts. This may come in the form of existing curriculum, equipment (e.g., robotics kits for camp), PYD training, or specialist expertise needed for a consultation on a specific project.
- 2. Review the MOU annually. While the parameters outlined in the original MOU may not change from year to year, an annual review serves as a check-in for all partners. Consider reviewing the document as part of a regularly scheduled meeting. This self-check may provide an opportunity to congratulate partners on successes to date, and help nip potential problems in the bud.

Sustainable partners communicate with and support each other.

- 1. Commit to the partnership. Partnerships, like any relationship, will have their share of "ups and downs." Also like any relationship, they need to be nurtured to ensure sustainability. New partnerships will require more effort.
- 2. Take small steps. It's not necessary to form complicated relationships in the beginning stages of the program. A sound strategy for developing sustainable organizational relationships is to start small and grow the partnership.
- 3. Recognize that the journey is shared. All partners should feel ownership of the work. Be sensitive to what is happening in the partner's world, as these things may affect the partnership. Make every effort to co-present at conferences, write each other into grants, and serve on each other's committees. Support partner activities and events!
- 4. Revisit the partnership often. Discuss what's working well and what's not so that the relationship continues to evolve and meet changing needs.





- 5. Communicate, communicate and then communicate some more! Establish regular communication with partners. It is important to engage in frequent communication, even if there is nothing "wrong" at the moment.
- 6. Practice patience and perseverance. Program partners are just as busy as 4-H professionals! It takes time and patience to nurture sustainable partnerships. Cultivate relationships, even if the initial reason for partnering does not work out (e.g., failure to get a particular grant).

Sustainable partnerships work together to design, implement and evaluate programs.

- 1. Stay focused on 4-H Science program goals. A "golden" opportunity to partner with other organizations will align with 4-H Science goals, needs, and current programming agenda. Otherwise, the partnership could end up adding more work than value. Thoughtfully account for the costs and benefits of such a partnership, and do periodic self-checks to decide if you want to keep moving forward.
- 2. Achieve consensus on goals for all partners. Develop a program or solution that meets all partners' needs. Truly collaborative partnerships require extensive planning and understanding regarding each other's needs and desired outcomes. Know what all partners need in order to report "success."
- 3. Measure, demonstrate and share results. Partners will also want and need to show that their work (and in this case, shared work) makes a difference for youth and for communities. Involve partners in evaluation planning from the beginning, and seek out joint-venues to disseminate program successes (see also <u>4-H</u> <u>Science Program Design</u>).

Sustainable partnerships promote and recognize all partners.

- 1. Coordinate efforts to publicize programs. It is important for the partnering organizations to discuss and clarify which organization is publicizing the sessions, what types of graphics or photos will be used, what "copy" or text will be used, and if efforts of both organizations are needed. It may work best if 4-H supplies the copy or text to be used to describe the program (including graphics or photos), while the partnering agency supplies other information regarding dates/time/locations, etc. It is ideal if 4-H can review the final copy before it is released to the public.
- 2. Identify up front how 4-H is to be recognized in the program. It is important that youth program participants and their parents know they are participating in 4-H Science programs.
 - Co-brand all program materials with the 4-H Emblem (flyers, enrollment forms, signs, posters, take-home sheets, etc.).
 - Provide youth with t-shirts that include the 4-H Emblem and have them say the pledge before meetings (promotes feelings of belonging).
 - For additional information on co-branding and marketing please see <u>Marketing and Branding 4-H in Urban</u> <u>Communities</u>.
- 3. Recognize all program partners. All program partners are important to success no contribution is too small to recognize. Use formal and informal methods of recognition as appropriate (e.g., public article, thank you note, formal certificate, invitation to attend special events, etc.).

Partnering with Afterschool Providers

Introduction

Partnering to expand 4-H Science afterschool program delivery can leverage networks, resources and opportunities to reach youth traditionally overlooked by science programs. Strong partnerships are a hallmark of successful afterschool programs. However, afterschool partners do not typically have the expertise, resources, or program design to support delivery of science, engineering, and technology learning experiences.

There are a variety of afterschool providers within most urban areas: schools, youth organizations (Boys & Girls Clubs, Ys), city parks and recreation departments, faith-based organizations, and so forth. This presents a tremendous opportunity to reach urban youth with 4-H Science programs. The purpose of this chapter is to provide promising practices that will help develop and sustain successful 4-H Science afterschool programs in partnership with afterschool providers.

The afterschool field has certainly evolved. Initially, afterschool sites were merely custodial agents (child care), providing a safe place for youth to finish homework and simply "hang-out" until parents arrived. It was soon recognized that youth needed something more to occupy their time – so sites began to include recreational and arts & crafts activities – which often meant simply providing youth with access to recreational equipment and/or a "craft station." The evolution continued as sites began to offer youth enrichment activities, and often invited 4-H to present one-time activities to youth.

The goal for 4-H Science programming in afterschool venues is to move beyond offering activities to providing youth with ongoing, sequential programming that leads to mastery of *4-H Science Abilities*. The key to success for achieving mastery is to intentionally design programs of appropriate duration and frequency, and to sequence program activities to build upon previously learned skills. (For more information on what constitutes a 4-H Science Program, please see the chapter on <u>4-H Science Program Design</u>.)

There are two models for delivering 4-H Science programs in afterschool settings: direct delivery and training collaborating staff. The direct delivery model utilizes 4-H staff and volunteers under the direction of the 4-H professional. Direct delivery provides the greatest opportunity for fidelity of implementation, and allows for ongoing, continuous training (content and context) for program facilitators. Program staff are paid from grant or subcontract funds, or with other incentives for teens.

In the training collaborating staff model, 4-H provides the science curriculum, training, and other resources and support for on-site staff to deliver programming. Depending on the degree of site readiness, this model can be difficult to implement (and evaluate) with a high degree of confidence. It can also prove difficult to provide continuous, ongoing training to site staff due to a number of motivational and logistical factors. However, with the right sites and collaborating staff, the training model can be an excellent way to extend the reach of 4-H Science programs in urban communities.

Programming success is also related to the type of afterschool site. For example, partnerships with school-based sites tend to better support structured programs. School-based providers require youth to enroll in their program, and in most cases the same youth attend on a fairly regular basis. Drop-in, non-school based afterschool





sites may not have consistent youth attendance. These sites also tend to offer more recreational activities than opportunities for sequential programming.

Promising Practices

The promising practices for *Partnering with Afterschool Providers* are subdivided into four categories: (a) Program Planning and Evaluation, (b) Developing and Sustaining Partnerships, (c) Staffing, and (d) Training.

Program Planning and Evaluation

- 1. Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to planning afterschool programs.
- 2. Develop and implement 4-H Science "programs." See 4-H Science Program Design.
- 3. Develop measurable process and outcome objectives. See 4-H Science Program Design.
- 4. Identify evaluation (success) criteria for all objectives. See 4-H Science Program Design.
- 5. Obtain funding to support a direct delivery programming model. Direct delivery (using associate staff) of 4-H Science programs greatly reduces problems related to fidelity of implementation (see also *Item #1* under *Staffing* below).
- 6. Structure weekly, sequenced 4-H afterschool sessions as part of a larger multi-week program. Programs can be implemented for 10-12 weeks (works well with trimester scheduling), a semester, or over the entire school year. Programs should be project-based. Consistency helps all involved with scheduling and avoiding conflicts.
 - Divide the school year into semesters or trimesters (September-December, January-March, April-June).
 - Offer *different* 4-H Science programs during these trimesters (will depend upon on how the collaborating afterschool site structures their programming).
 - Include a closing showcase at the end of the multi-week program (see <u>Recognizing Youth and Showcasing</u> <u>Programmatic Efforts</u>).
- 7. Consult the afterschool calendar when scheduling programs and determining months and days of the week for implementation. Take into consideration the school's calendar, school breaks and holidays, and teacher in-service days.
 - Work with the collaborating provider to schedule everything upfront and avoid conflicts with other program providers, field trips, and so forth.
 - Provide the afterschool site and parents with a typed schedule of the 10-12 week program.
- 8. Pre-determine the number of youth to recruit and enroll in the program. Refer to program objectives, and consider the curriculum, materials, and staffing level required.
 - Work with providers to ensure youth are available for the multi-week session (day and time).
 - Provide enrollment packet (program flyer, schedule, and 4-H enrollment form) to collaborating provider at

least three weeks prior to the program.

- 9. Increase the capacity for sustained involvement of youth participants in 4-H Science by rotating programs and staff each semester/trimester. Provide opportunity for youth to age-out of a site before returning program to that site.
- 10. Include Family Science Nights. Involve the entire family in 4-H Science programs. Serve dinner, provide activities (activity stations work well), and distribute take-home activities to extend the learning. Use a science theme such as flight or recycling.
- 11. Evaluate the program against program objectives. See 4-H Science Program Design.
- 12. Share evaluation results. See 4-H Science Program Design.

Developing and Sustaining Partnerships

- 1. Read the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability. This introduction contains critical "overarching principles" that are vital to developing and sustaining program partners. The information included here is specific to partnering with afterschool providers.
- Explore opportunities to partner with state afterschool organizations. For state afterschool associations see <u>National AfterSchool Association State Affiliates</u>. There are also state <u>afterschool networks</u>. Offer to provide science training to site directors and front line staff.
- 3. Explore partnerships with 21st Century Community Learning Centers (CCLC). The 5-year federal 21stCCLC grant provides funds for direct delivery of programs that support academics, as well as training (see 21stCCLC in Resources below). 4-H subcontracts with the 21st Century grantee to provide science programming for collaborating afterschool sites.
- 4. Attend community-wide out-of-school time (OST) summits, conferences, etc. Increase 4-H visibility in the OST community. 4-H Science is rapidly becoming known for providing excellent science programming, so being at the table will lead to opportunities for collaborations, grants, and so forth.
- 5. Assess the potential provider's readiness for 4-H Science programs. Not all sites are interested in or structured for this type of programming. Signs of readiness include:
 - The site wants to include science "programs," not just activities and events.
 - Collaborating staff are fully committed to providing necessary support to 4-H program staff (direct delivery model). Site staff should be engaged in the lesson/activity and ready to assist youth in an appropriate manner and/or handle any disciplinary challenges. This should not in any way be construed as a "free" period for "hanging out" or engaging in personal activities (e.g., breaks, phone calls, texting).
 - Collaborating staff are fully committed to fidelity of implementation (training model). They must be willing to attend trainings and implement lessons and activities appropriately.
 - Site administrators are fully committed to providing support to site and 4-H staff as needed. If the site's staff/youth ratio is 1:15, and 15 youth are enrolled in the program, then at least one staff person should be present during 4-H Science programs. Administrators should be willing to commit to release time for site staff to get training (training model). They must also be willing to hold site staff accountable for successful program implementation *regardless of model used*.





- 6. Offer to host a Family Science Night for a potential afterschool site. This will provide the site with a glimpse of what 4-H Science has to offer. Clearly state, however, that 4-H Science is about *programs*, not activities and events.
- 7. Commit to lengthy, regular, face-to-face (and other) contact with new site directors. It is usually quite time intensive to prepare a new afterschool site for 4-H Science (assuming the site is science ready). It takes time to develop the relationship and to ensure the partner understands all aspects of the program design (e.g., objectives, scheduling, etc.) and implementation (e.g., enrolling youth, evaluation, etc.).
- 8. Create a Memorandum of Understanding (MOU). See the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability.
- 9. Identify up front how 4-H is to be recognized in the afterschool program. It is important that afterschool program participants and their parents know they are participating in 4-H Afterschool. For additional information on co-branding and marketing please see the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability and <u>Marketing and Branding 4-H in Urban Communities</u>.
- 10. Work with collaborating providers to identify and agree upon appropriate program space. Many afterschool programs occur in large multi-purpose rooms, cafeterias, and gymnasiums. This kind of multi-use space is not suitable for 4-H science programs (lack of focus, distractions, etc.).
- 11. Keep in constant communication with implementation sites. All required documentation must be precisely communicated to all volunteers and staff members. Follow through on stated deadlines by sending frequent reminders about needed information. Visit sites and reassure staff and volunteers of continuous support and availability.
- 12. Be willing to walk away from an unproductive situation. Partner sites may fail to live up to expectations, or may not be as ready to support 4-H Science programs as originally anticipated. Terminate the relationship (without burning bridges) and focus on developing and sustaining programs with other partners.

Staffing

- 1. Utilize temporary, part-time 4-H program assistants (direct delivery). Hire part-time staff for a particular program or curriculum and then rotate him/her through the afterschool sites. Position(s) can be funded by a joint grant or subcontract.
- 2. Recruit teens as program facilitators. Teens, under the leadership of 4-H staff doing direct delivery, are a great way to improve the facilitator/youth ratio. Place afterschool youth in teams, and assign a teen to each team or pair of teams (for more information see <u>Staffing with Teenagers and Teens as Cross-Age Teachers</u>).

Training

- 1. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers. The promising practices contained here are geared specifically to training staff/volunteers to deliver 4-H Science programs in an afterschool setting.
- Assess the skills and interests of the collaborating afterschool staff. Every afterschool site will be unique. It
 is important to plan appropriately for the staff you are training. Ask staff to complete the 4-H Science Core
 Competencies Self Assessment Tool (see chapter <u>4-H Science Program Design 4-H Science Checklist</u>) to
 assist with planning professional development opportunities.





- Staff may include (but not always) professional educators. This can be good and challenging they have experience working with youth, but are more comfortable in a formal education setting.
- Non-professional educators may include younger adults who want to get into the field, paraprofessionals from the school, community volunteers, and/or retirees.
- Some staff may have science backgrounds, but many (if not most) will not.
- 3. Identify the best time for training afterschool staff. Communicate with the site coordinator to ensure staff availability. Negotiate release time and compensation for collaborating staff to attend trainings. Many staff work at the school during the day or have other full-time jobs. Each site is different depending on the staffing pattern, so it is important to work with them to find the best time (e.g., evenings, Saturdays, seasonal breaks, etc.). Provide refreshments/meals, especially important if holding a training immediately following the end of the afterschool day.
- 4. Offer state certified training credits, units, or hours. Provide training opportunities that meet state requirements for licensure of afterschool sites. The 4-H office completes the clock-hour certification paperwork with the state, and includes the certification information in advertisements and on all participant certificates provided. You can partner with your university to offer Continuing Education Units (CEUs).

Case Studies

Bird – Providing Expertise and Resources to a Large Afterschool Partner to Make Science Fun. Sacramento County 4-H has a 13-year history of partnering with the Sacramento START afterschool program to enhance science programming. Sacramento START is run through the City of Sacramento and serves over 5,000 youth at 60 sites in five school districts. 4-H helped to bring the 4-H YES Program (grades K-3), 4-H On the Wild Side environmental education camp (grades 4-6), and the 4-H Water Wizards Program (grades 4-6) to hundreds of youth participating in the START program. While there are other 4-H Afterschool partnerships, this is by far the longest and strongest. 4-H has something most afterschool environments highly value – fun, hands-on learning experiences that engage kids, even at 4:00 p.m. The partnership with Sacramento START has taken many forms over the years. 4-H has provided teen facilitators, training, curricula, science kits, and management to the YES program. In addition, youth and staff from START have attended the On the Wild Side environmental education camp. Most recently, 4-H has trained START program leaders to deliver the 12-week 4-H20 Water Wizards Program to 500 youth annually. START provides staff, youth, and financial resources to our shared work; 4-H provides expertise in science programming and the resources to make it fun. **–Marianne Bird, University of California**

Martin – 4-H Afterschool Science Partners with 21stCCLC and the Corridor STEM Initiative. Since 2007, 4-H has trained collaborating and 4-H staff to deliver urban 4-H science programs in afterschool sites in Iowa City and Linn and Johnson Counties. More than 500 youth have participated in these programs. The out-of-school audience includes kindergarten through sixth grade youth in the Iowa City/Cedar Rapids corridor. Programming focus is on working with girls and youth from all socio-economic groups. The goals and objectives of the program include: (a) to increase youth's understanding of science, technology and engineering in everyday life; (b) to teach youth to enhance and apply their knowledge in science, technology, and engineering through hands-on experiments; and (c) to increase youth's understanding of STEM content and improve interest in STEM learning and careers.

Partnering with a community STEM coalition and the Iowa City Community School District through 21st Century Community Learning Centers (CCLC) was vital to starting afterschool 4-H science. Through these two initiatives, funds are available for science programs including weekly afterschool science at four 21stCCLC schools in Iowa

City and four afterschool Engineering is Elementary eight-week programs in Linn and Johnson Counties. Part-time staff are employed for the program. The majority of staff are students (especially education majors) from the University of Iowa in Iowa City. 4-H teen volunteers have also assisted with the afterschool program. Big Brothers Big Sisters School Buddies, part of the 4-H program in Johnson County, assist with the science activities at one site. At another 21stCCLC, 4-H staff work with school staff to lead Family Science Nights during the school year. **–Janet Martin, Iowa State University**

Nolen – 4-H Science Project Clubs and Family Science Nights in Afterschool. In Houston, partnering with established afterschool programs has expanded 4-H outreach to youth not likely to be involved in science programs. 4-H science enrichment is delivered in organized 4-H Afterschool project clubs and programs. 4-H staff partner with Harris County Precinct 2 Youth Services, 21st Century Community Learning Centers (CCLC), and area schools to engage youth, teachers, and site staff in science inquiry programming. Staff facilitate the development of science process skills with research-based curricula. Over the past two years, 4-H has provided leadership for the development of science enrichment for Precinct 2 Youth Services and has established 4-H Science Afterschool clubs - which have elected officers to provide leadership for the program. The youth decide which projects and science topics to explore. 4-H staff partner with science teachers leading Junior Master Gardener® youth horticulture programs at 21stCCLC sties to offer additional 4-H Science learning and support for service-learning projects. 4-H Science filmmaking projects were expanded through a partnership with a media teacher who wanted to involve youth (grades 3-5) in science filmmaking projects afterschool. 4-H provided assistance with planning; resources, such as the online 4-H Filmmaking Studio and Workshop; and access to equipment for film editing. Through a partnership with an area high school, teens from the media department were recruited to mentor and teach filmmaking at partnering sites. This new network of school-based programming stemmed from the existing partnership with Precinct 2 Youth Services.

A common goal of afterschool programs is parent involvement. Getting families to attend an afterschool event is a great way to showcase the program, recognize youth for their achievements, and build a relationship with parents. 4-H has worked with afterschool partners to co-sponsor events such as Family Science Nights and programs to showcase youth projects. These events can be used to interpret program accomplishments to parents and key stakeholders, recognize youth, and celebrate the support of the partners, volunteers, and site staff. **-Sheryl Nolen, Texas A&M University**

Resources

21st Century Community Learning Centers - this program, through the Department of Education, supports the creation of community learning centers that provide academic enrichment opportunities during non-school hours for children, particularly youth who attend high-poverty and low-performing schools. The program helps youth meet state and local student standards in core academic subjects. For more information, including current grantees in your state, visit <u>http://www2.ed.gov/programs/21stcclc/index.html</u>.

Afterschool Alliance STEM Resources – the Afterschool Alliance is the nation's leading voice for afterschool and is dedicated to raising awareness of the importance of afterschool programs and advocating for more afterschool investments. The Afterschool Alliance works with policymakers across the country. Today the Afterschool Alliance boasts more than 25,000 afterschool program partners and their publications reach more than 65,000 individuals every month. STEM info and resources are available at <u>http://afterschoolalliance.org/STEM.cfm</u>.

Coalition for Science After School – the Coalition is a strategic alliance of individuals and organizations from STEM education, youth development, and programs held outside of school time. Their mission is to coordinate and mobilize community stakeholders to strengthen and expand opportunities that engage young people in af-





terschool science. A directory of members, and several resources are available at <u>http://www.afterschoolscience.org/</u>.

Frontiers in Urban Science Exploration Resource Guide – a resource guide offering strategies to advance science education in afterschool programs. Available at <u>http://www.tascorp.org/content/document/detail/3040/</u>.

Harvard Family Research Project OST Resources and Tools – since 1983, the Harvard Family Research Project (HFRP) has helped stakeholders develop and evaluate strategies to promote the well being of children, youth, families, and their communities. Out-of-school time programming is one of three focus areas, and a wealth of OST resources and tools are available at <u>http://www.hfrp.org/out-of-school-time</u>.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>.

Science in Afterschool Literature Review – a review of afterschool science education practices (including inquiry and project based learning) and afterschool science programs developed for The National Partnership for Quality Afterschool Learning. Available at: <u>http://www.sedl.org/afterschool/toolkits/science/pdf/SERVE%20Science%20</u> in%20Afterschool%20Review.pdf.

Partnering with Summer Program Providers

Introduction

4-H offers traditional audiences many summer camp opportunities at state camp facilities (often far from urban areas) and some full-week 4-H exploratory day camps (often not in the urban center of a county or targeting urban youth). In urban communities, however there are myriad opportunities to partner with existing summer day camp providers to offer 4-H Science programming to youth. Potential partners include: other youth organizations such as Boys & Girls Clubs, and Ys; libraries; parks and recreation departments; community/neighborhood centers (often city-funded); faith-based organizations; and so forth.

Another excellent opportunity is to work with existing afterschool partners who also host summer day camps. This allows for continued work with existing partners, and provides continuity for youth who participated in the afterschool program.

4-H can provide entire theme-based weeks of science programming at partner sites (e.g., robotics camp, nature camp, etc.) or provide an enrichment component (science programming as part of the camp during a designated time throughout the week and/or summer). The delivery modes may be direct delivery or through training collaborating staff. Trainings are generally held over a one-week period the week before camp (as opposed to continuous, ongoing trainings). These trainings should include the science curriculum, inquiry-based and experiential learning, positive youth development, developmentally appropriate practices, group management, and so forth (see <u>Training Others to Deliver High Quality Science Programming</u>).

4-H and the university system have a lot to offer, in partnership with providers, to take the youth summer experience beyond recreation with hands-on, minds-on, fun, and engaging 4-H Science programming that helps develop foundational skills and interests in science. Thus, summer camps offer another opportunity to positively effect school-year science learning, interest, and engagement. The purpose of this chapter is to provide promising practices that will help develop and sustain successful 4-H Science summer programs in partnership with provider organizations.

Promising Practices

The promising practices for *Partnering with Summer Program Providers* are subdivided into three categories: (a) Program Planning and Evaluation, (b) Developing and Sustaining Partnerships, and (c) Staffing.

Program Planning and Evaluation

- 1. Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to planning summer programs.
- 2. Develop and implement 4-H Science "programs." See 4-H Science Program Design.
- 3. Develop measurable process and outcome objectives. See 4-H Science Program Design.





- 4. Identify evaluation (success) criteria for all objectives. See 4-H Science Program Design.
- 5. Use creativity in designing summer programs. Summer camps offer possibilities to engage in activities that may not be possible in afterschool or traditional program settings. Look for opportunities to provide programming that supports application (a critical component of experiential learning) and/or service (essential element generosity).
- 6. Utilize existing inquiry- and research-based science curricula. Adding an education component to a recreation program is always a plus, but youth also want fun and excitement! Look for curriculum that can be implemented outdoors, or that provides opportunities to increase physical activity (e.g., hikes, scavenger hunts, geocache courses, etc.). For more information regarding curricula see <u>Inquiry Based Learning Approaches</u>.
- 7. *Plan in advance of program implementation.* The closer to the program's beginning date the more hectic planning becomes. Allow several months to organize the details of the program and promote it.
 - Summer camps begin to advertise in February, so they need everything related to promotion before then.
 - Create a timeline that includes distribution of mandatory enrollment and consent forms. Set enrollment deadlines no later than three weeks before camp start date.
- 8. Know where the program or activities are going to take place. Clearly communicate the type of setting and resources that will be needed during the sessions. For example: Is water needed (buckets of water vs. access to running water)? Is electricity needed? Are there any restrictions to using outdoor spaces?
- 9. Evaluate the program against program objectives. See 4-H Science Program Design.
- 10. Share evaluation results. See 4-H Science Program Design.

Developing and Sustaining Partnerships

- 1. Read the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability. This introduction contains critical "overarching principles" that are vital to developing and sustaining program partners. The information included here is specific to partnering with summer program providers.
- 2. Provide information on contacts and associations with people and agencies that will offer support and cooperation to camps and camp directors. It is important to work together to pool resources and determine which organizations are willing and interested in assisting with camps (e.g., busing, camperships, guest facilitators, etc.).
- 3. Create a Memorandum of Understanding (MOU). See the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability.
- 4. *Keep in constant communication with implementation sites.* All required documentation must be precisely communicated to staff and volunteers. Follow through on stated deadlines by sending frequent reminders of needed information. Visit sites and reassure staff and volunteers of continuous support and availability.
- 5. Coordinate efforts to publicize programs. See the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability.







Staffing

- 1. Utilize temporary, part-time 4-H program assistants (direct delivery). Summer is an excellent time to find qualified, experienced part-time staff. Look for science teachers and other educators who are off for the summer. Pay them as close to scale as possible. Tap into college students looking for part-time summer jobs, particularly those with education and science-related majors. Position(s) can be funded by a joint grant or subcontract.
- Recruit teens as program facilitators. Teens, under the leadership of 4-H staff doing direct delivery, are a great way
 to improve the facilitator/youth ratio. Place summer camp youth in teams, and assign a teen to each team or pair of
 teams (for more information see <u>Staffing with Teenagers and Teens as Cross-Age Teachers</u>).

Case Studies

Enfield – Extending the Reach of 4-H Science through a Variety of Community Partners. Over the 15 year history of 4-H SLO (San Luis Obispo) SCIENTISTS, the program has actively sought summer partners in order to reach more youth with inquiry based STEM activities. When needed, the 4-H SLO SCIENTISTS program has been modified to meet the needs of the summer program, time constraints, overall length of the program, and other particulars specific to the provider. Some of the summer program providers over the years have been:

- Salvation Army Youth Programs
- Exploratorium/Discovery Center
- Housing Authority sites
- Summer Recreation Programs
- County Library System

The latest and current summer program partnership is with the SLO County Library System, which has 14 library branches throughout the county. After a couple of discussions, a new partnership was formed and SLO SCIENTISTS activities were conducted to a delighted audience of youth (and sometimes attending adults) at seven library sites throughout the county. SLO SCIENTISTS facilitators were recruited by the SLO SCIENTISTS Coordinator to facilitate activities with young people on specific days provided by the local library staff. Some of the facilitators recruited teens or older SLO SCIENTISTS alumni to help facilitate. All costs of the program were paid for by a grant written by library management for the program. **-Richard Enfield, University of California**

Martin – Taking 4-H Science on the Road to Enrich Summer Learning. For more than 20 years, Summer 4-H on Wheels has travelled to parks, apartment complexes, and schools in Iowa City and Johnson County. Science is the core of the hands-on learning at the two-hour weekly sessions for seven weeks during the summer. Partners have included Iowa City Community Schools (Yet Another Learning Experience-YALE), Johnson County Social Services, Iowa City Parks and Recreation, and numerous summer program sites. During summer 2010, 500 youth participated in the program at 19 locations. The science emphasis rotates annually through life science, physical science, and earth/space science based on the K-8 Curriculum Regional Framework for schools in the Grant Wood Area Education Agency (AEA). The science consultant from the Grant Wood AEA met with the 4-H staff to review the Iowa science core curriculum and suggest ways to help the summer curriculum support the school year curriculum.

Another summer program, GEAR-TECH-21, combines robotics, GPS (global position systems), and GIS (geograph-

ic information systems). The 4-H program in Nebraska received a National Science Foundation grant to develop and lead the program to inspire youth to enter STEM careers. To expand the program, Johnson and Linn County 4-H received grants for the 2010 summer program. Youth were recruited through the schools and through 4-H. –Janet Martin, Iowa State University

Mullens – Partnering with Camps to Promote Environmental Stewardship. The Youth Wetlands Education and Outreach Program (YWP) provides the primary funding for two environmentally-based summer camps that focus specifically on wetlands. Both camps have directors that organize and implement the camps, while the YWP offers logistical support and in-kind contributions. At the beginning of each calendar year, program staff meet with the camp directors to determine financial needs, staffing needs, reporting guidelines, and improvements to the curriculum. Details on each camp:

- <u>Marsh Maneuvers</u> is a five-day camp held on a state wildlife refuge in coastal Louisiana. High school youth are immersed in wetland ecology lessons, including fishing, crabbing, cast netting, water chemistry testing, wildlife observation, seafood processing, boating, policy debates, and more. The camp is a collaboration between the YWP (LSU AgCenter 4-H), Louisiana SeaGrant, Louisiana Department of Wildlife and Fisheries, and a family-owned corporation, the McIllhenny Company.
- <u>Wild Woods Wanderings</u> is a five-day camp providing high school participants with first-hand experiences in a forested wetland ecosystem on a national wildlife refuge in North Louisiana. Camp activities consist of outdoor survival skill training and classes on map and compass skills, water quality, public policy, pollution, and aquatic education. This camp is a collaboration between the YWP (LSU AgCenter 4-H), Louisiana Department of Wildlife and Fisheries, Louisiana Department of Natural Resources (La DNR), Northeast Delta RC&D, Poverty Point State Park and Historic Site, U.S. Fish and Wildlife Service, United States Department of Agriculture, Natural Resources Conservation Service, Louisiana Department of Environmental Quality, Louisiana Department of Culture, Recreation and Tourism, and the Murphy Family Foundation.

In addition, the YWP provides the curriculum, staff, and funding for the "Wetlands Track" held at 4-H Camp Grant Walker and Louisiana Outdoor Science and Technology (LOST) Camp that is based on the 4-H Science Mandate. Over 4,000 youth in 4th-8th grade participate in these camps that are offered for 10 weeks over the summer. Through this "Wetlands Track," youth receive hands-on experience in wetland environments, and are motivated to become ambassadors for wetland preservation, conservation and restoration, and to become responsible environmental stewards. **–Ashley Mullens, Louisiana State University**

Nichnadowicz – Corporate Sponsor Provides Funding and Scientists for 4-H Summer Program. The Union County, New Jersey 4-H Summer Science Program develops interest in science and science careers in low-income youth. The program targets youth in 1st-6th grades residing in Elizabeth, Plainfield, and Rahway. Since 1992, for seven weeks each summer, 4-H science facilitators travel from the Union County 4-H Center to 19 partnering day camps to provide informal science programming. The number of youth served has doubled since its inception, and in recent years the program has served over 600 youth each summer. The program's longevity and growth is at least in part due to the fact that it fulfills a legitimate need for informal science education. The program has been funded since 1993 by a pharmaceutical corporation located in Union County.

4-H Summer Science emphasizes science processes using the experiential learning model. A different science theme is presented each year. Some past themes have been the human body, aeronautics, robotics, kitchen chemistry, and physics with toys. Youth also learn about science careers through visits from science professionals such as lab technicians, researchers, chemists, and so forth. Many of these scientists are from the same phar-





maceutical corporation that funds the program. The majority of youth have never met a science professional in person. Program evaluations have demonstrated an increase in youth interest in science as a field of study and as a career.

The 4-H Summer Science Program is unique in Union County in several ways. First, it is a 4-H program that is not volunteer or club-based. Due to the intensive nature of the program, it was decided that using paid employees would work best – to maintain quality programming, 4-H hires certified teachers to facilitate the lessons. Second-ly, this program was the first of its kind in the county to bring informal science education to day camps located in low-income areas. Although science is studied in the county's elementary schools, it had rarely been offered at a professional level through the summer day camps. Lastly, this program was implemented with several groups in the county who had not previously collaborated with 4-H. –**Jim Nichnadowicz, Rutgers University**

Resources

Building Quality in Summer Learning Programs: Approaches and Recommendations – identifies the different settings in which summer programs for disadvantaged youth most commonly take place – schools, parks and recreation departments, community- and faith-based organizations, and child-care programs – and examines the limitations and opportunities presented by each in building better programming. Available at <u>http://www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAreasofFocus/Out-Of-SchoolLearning/Documents/Building-Quality-in-Summer-Learning-Programs.pdf.</u>

Effective and Promising Summer Learning Programs and Approaches for Economically-Disadvantaged Children and Youth – summarizes findings from an extensive literature review that was conducted to identify the most promising models and approaches for meeting the needs of low-income children, youth, and families during the summer months. Available at <u>http://www.childtrends.org/Files/Child_Trends-2009_06_17_FR_SummerLearning.pdf</u>.

National Summer Learning Association – the National Summer Learning Association serves as a network hub for thousands of summer learning program providers and stakeholders across the country, providing tools, resources, and expertise to improve program quality, generate support, and increase youth access and participation. The association offers professional development, quality assessment and evaluation, and best practices dissemination. Available at <u>http://www.summerlearning.org/</u>.

Partnering with City Government and City Parks and Recreation

Introduction

Partnering with City Government and City Parks and Recreation Departments provides opportunities to take Cooperative Extension to the municipal level – working together to support each other's efforts to serve the needs of city residents. City governments are typically involved in youth development and out-of-school (OST) initiatives – often through a Department of Recreation, Department of Community and Youth Development, or similar unit. City governments recognize the value of providing programs that engage youth and help prepare them for productive futures and to be contributing community members. In some cases, Cities directly administer afterschool and summer programs, but more often they provide support to community-based organizations to administer the OST sites. Cities often oversee and distribute federal and state resources targeted for youth development. In addition, through the appropriate departmental office, the City often serves as a community-wide organizer of youth and OST serving organizations and providers. The National League of Cities (NLC) works on behalf of municipal leaders across the country to help them improve their communities. The NLC's Institute for Youth, Education and Families (see *Resources* below), has several publications outlining promising practices for City efforts in the areas of afterschool, summer, and youth programming. 4-H professionals working in urban communities should familiarize themselves with the work of city government and become aware of opportunities for partnerships.

City Parks and Recreation Departments have an abundance of resources available to help further 4-H Science programming – including parks and naturalists available for outdoor exploration and environmental education. Through recreation divisions, Cities often have community centers and recreation centers that are interested in non-recreational programming. 4-H can greatly enhance offerings at these sites with fun, engaging, and educational 4-H Science programs that take advantage of indoor and outdoor environments. The purpose of this chapter is to outline promising practices for working with City Government and City Parks and Recreation Departments to provide quality 4-H Science programs to urban youth.

Promising Practices

The promising practices for *Partnering with City Government and City Parks and Recreation* are subdivided into two categories: (a) City Government and (b) City Parks and Recreation.

City Government

- 1. Understand as much as possible about the City's involvement in youth development and OST efforts. There is often more to City youth programming than is initially apparent. Some questions to ask:
 - Does the City administer program sites across the city?
 - Does the City support community-based organizations (CBOs) who administer OST sites?





- Does the City administer youth development and/or OST grants or contracts?
- What level of support and/or resources does the City provide to the youth development and OST players in the community?
- What role is appropriate for 4-H?
- 2. Learn about federal and state funding coming to the City to support youth development and/or OST initiatives. Common funding streams may include: Community Development Block Grants, U.S. Department of Justice Office of Juvenile Justice and Delinquency Prevention Grants, U.S. Department of Justice Weed and Seed Grants, 21st Century Community Learning Center Grants, and so forth. Determine whether there is an appropriate role for 4-H Science programs in the context of these grant programs.
- 3. Maintain or increase visibility "at the table." Help City officials get to know what is available from 4-H. Advocate for 4-H Science programs and the broader youth development and OST field. Visibility can lead to substantial partnerships and resources.
 - Attend the annual youth summit, local OST conference, or other types of community-wide events for those in youth development and OST fields. These are often sponsored by the mayor's office or other appropriate departmental offices (e.g., Department of Youth and Community Development, Department of Parks and Recreation, etc.).
 - Participate in City sponsored youth development and OST strategic planning, asset mapping, and needs assessment efforts.
 - Offer to serve on youth development and OST boards, advisory groups, commissions, and so forth.
- 4. Develop a niche in areas that require technical assistance unique to 4-H and the Land Grant University System. Be aware of City government initiatives that may require specialized assistance, such as community gardens, positive youth development (PYD) training, OST science, and so forth.
- 5. Provide positive youth development, curricular, and/or program training for City staff. Many grants require staff training. Look for opportunities to train staff at community/youth/recreation centers, summer camps, and afterschool sites.
- 6. Explore possibilities to become involved with summer jobs programs for teens. Many cities sponsor these opportunities using state and federal funding, often associated with the local Workforce Investment Board (WIB).
- 7. Involve youth in 4-H Science activities that support City issues or needs. Contact the relevant City departments to see whether they need assistance with community mapping projects, water quality testing, and so forth. Discover how to involve 4-H teens on City Youth Councils (Mayor's Youth Councils), Commissions, or Boards.
- 8. Invite the mayor, city council members, departmental administrators, and collaborating staff to program showcases and 4-H/Extension stakeholder meetings. Include them on mailing lists for newsletters and the annual report. Invite them to address 4-H youth groups or participate in other ways (e.g., panelists, judges, etc.). Utilize community rooms/space at City Hall for program showcases and displays, and invite City officials to participate. Provide opportunities for youth to present to the City Council, City departments, or other government entities.





- *9. List your program in online citywide directories of youth serving organizations.* Advertise the services 4-H has available for youth as well as collaborating organizations.
- 10. Disseminate program successes continuously. The more the mayor's office or other appropriate departmental administrators know about 4-H's efforts in the City, the better. Visibility can lead to substantial partnerships and resources!

City Parks and Recreation

- 1. Discover available city, county, state, and federal public spaces and parks in or near urban communities. Develop a working relationship with parks and recreation departments or park commissions.
- 2. Work with city, county, and state parks and recreation departments to get urban youth connected to *local outdoor resources*. Parks are often underutilized by urban residents, and many park systems are interested in ways to help connect urban youth to the outdoors. Outdoor/environmental education, adventure programming, and exploration are niches that 4-H programs are able to fill based on staff expertise, resources, and interests.
- 3. Partner with park planners and designers to develop appropriate, engaging environments. Emphasize "cool contexts" the more diverse and engaging a learning environment is the more likely it will be used. Educate planners/designers about youth development and age appropriate environments. Even better, have youth work with them directly!
- 4. Utilize public parks as venues for programming. Public parks are great resources for ongoing programs in the sciences, but they are also great venues for summer camp programs, either as a component of a program or for hosting the entire camp.
- 5. Engage park naturalists or other science educators in 4-H Science programs. Park science staff love to share what they know with youth. Involve 4-H youth in relevant educational programs sponsored by the parks.
- 6. Look for opportunities for youth to engage in beautification, urban forestry, or other major planting projects conducted by City Parks and Recreation. Such activities can support application of concepts learned in 4-H Science programs while reinforcing principles of community engagement.
- 7. Take advantage of outdoor environments to hold meetings. There are a number of advantages to meeting outdoors (e.g., awareness of new parks/facilities, demonstrating commitment to active science/nature, negotiating a more complex environment, etc.). Ensure everyone is aware the meeting will be outside and that they need to come dressed for the conditions.

Case Studies

Arnett – 4-H + Five Rivers MetroParks = Adventure Central. Adventure Central is a community-based, positive youth development partnership between the county parks system (Five Rivers MetroParks) and 4-H. Adventure Central is physically located in a 60-acre park that includes recreation and hiking trails; a creek; and a building with five classrooms, a large multipurpose room, and a kitchen. Adventure Central has served at-risk children and their parents in the West Dayton community for over 10 years. The community identified a need for positive development opportunities for youth and their families through science activities. The partnership exists because

both organizations recognized that alone they did not have the capacity to accomplish this goal. This partnership has created exciting, engaging, and diverse outdoor learning contexts that have increased youth's participation in the outdoor world and improved their attitudes regarding the environment.

The partnership with Five Rivers MetroParks supports the 4-H summer teen work-based learning program, Job Experience and Training (JET). In this program, urban youth engage in work and learning experiences related to a parks career. Each summer 20-25 teens are placed in a variety of roles and mentored by an adult supervisor during the eight-week program (see also *Arnett Case Study* in *Staffing with Teenagers and Teens as Cross-Age Teachers*).

Another goal of the partnership is to move individuals to independent use of park facilities. Many families are not fully aware of what is offered at the parks. This leads to underutilization of park resources. In addition to hosting family events in the parks, Adventure Central includes field trips to other park areas where the program could benefit from an outside speaker on a particular subject or from a specialized environment. Staff development sessions have also been led by parks staff with our team to improve practices and skills. **-Nate Arnett, The Ohio State University**

Randolph-Benjamin, Davis-Manigaulte – 4-H Partners with a Citywide Urban Forestry Initiative. As part of their ongoing urban 4-H Science initiative, the New York City (NYC) 4-H Youth Development Program is taking part in the MillionTreesNYC project, a citywide, public-private program enacted to plant and care for one million new trees across the city's five boroughs. The City of New York will plant 60% of the trees and the other 40% will come from private and community organizations, such as 4-H. NYC 4-H is promoting three components of the project:

- *Tree Planting:* 4-H joined citywide volunteer plantings in parks and abandoned urban areas, and currently partners with the NYC Parks Department to supply free trees to community residents and 4-H clubs for planting.
- Stewardship/Community Beautification: 4-H students became stewards over existing gardens and trees, adopting neglected community green spaces, maintaining tree pits, conducting community clean-ups and plantings, and building raised beds to plant flowers. 4-H provided starter supplies to groups.
- Environmental Education: 4-H Groups learned about urban horticulture, community mapping and the environment through 4-H Junior Master Gardener[®] (JMG) curriculum and MillionTreesNYC Educational Resources.

This initiative targets diverse ethnic communities in all five boroughs, historically underserved and under the national average for household median income, including: Harlem, Washington Heights, Bedford Stuyvesant, Crown Heights, Fort Green, Bushwick, Brownsville, Jamaica, Flushing, Far Rockaway, South Bronx and Staten Island through their 4-H clubs.

NYC-4-H hosted two science-related trainings, the JMG[®] training, a gardening program operated nationwide through the Cooperative Extension network and the Environmental Stewardship project. Fourteen volunteers participated. The JMG[®] curriculum introduces youth to "hands-on" group and individual learning experiences that promote a love of gardening, develop an appreciation for the environment, and cultivate the mind. This will help prepare students for spring gardening. The Environmental Stewardship project included a review of the summer pilot project and lessons learned. A total of 10 4-H sites will participate in fall bulb planting around tree





pits and other green spaces. -Lucinda Randolph-Benjamin and Jackie Davis-Manigaulte, Cornell University

Ripberger – Shared Resources Support Shared Goals. In Mercer County, New Jersey, 4-H has partnered with the City of Trenton Department of Recreation, Natural Resources, and Culture since 2003. At the time, the City was administering 10 afterschool and Saturday programs throughout Trenton, and 4-H was conducting outdoor education and adventure programs for youth at the collaborating sites through 4-H Afterschool Adventure. For this program, 4-H taps into county and state parks – such as a 70-mile canal and 2,500 acre park with miles of trails to expose urban youth to outdoor environments. The original partnership included funding from a Weed and Seed grant from the Department of Justice that provided support for youth development programming at schoolbased and community center sites. 4-H served as a member of the City's Weed and Seed steering committee and participated in citywide youth summits and boards hosted by the Department of Recreation. Since 2005, 4-H has partnered with City sites to involve youth in its Horses and Youth afterschool and summer programs at the Mercer County Equestrian Center, a facility of the county park commission. Starting in 2006, 4-H has provided training in positive youth development to City afterschool and summer camp frontline staff. With interest in additional 4-H programming, the City began providing salary support for a full-time 4-H program associate in 2008, which allowed 4-H to expand its science programming and the number of sites served. Even though the City no longer directly administers school-based programs, they continue to support community organizations that provide OST programs and continue to administer City owned community and recreation centers. In 2008, they partnered with 4-H to install a low-element challenge course at one of its recreation centers. Since 2008, the City has provided transportation, bus and driver, for multiple weeks of 4-H summer programs. -Chad Ripberger, **Rutgers University**

Resources

National Recreation and Park Association - NRPA is the leading advocacy organization dedicated to the advancement of public parks and recreation opportunities, <u>http://www.nrpa.org/</u>. National and state affiliates of NRPA are available at <u>http://www.nrpa.org/stateassociations/</u>.

National League of Cities' Institute for Youth, Education and Families - includes information on their afterschool and youth development initiatives. The Institute, a special entity within the National League of Cities (NLC), helps municipal leaders take action on behalf of the children, youth, and families in their communities. Available at <u>http://www.nlc.org/iyef/</u>. Several relevant publications may be found at <u>http://www.nlc.org/find-city-solutions/</u> iyef/afterschool (under tools and resources tab) and <u>http://www.nlc.org/find-city-solutions/iyef/youth-civic-en-gagement</u> (under tools and resources tab).

Partnering with Colleges and Universities and Campus-Based Scientists

Introduction

One of the greatest advantages of working in urban areas is access to multiple institutions of higher education. Urban areas are more likely to have a greater density of colleges and universities than other geographic areas. A land grant university (LGU) may or may not be nearby, but there are other institutions, including technical and community colleges that are eager to work with 4-H Science programs. Make connections with their science, engineering, technology and education departments *before* a need arises. It takes time to build these relationships, and many opportunities must be planned at least a semester in advance!

Another advantage to urban 4-H Science programming is that the proximity of youth to college/university campuses makes it relatively easy to provide on-campus experiences. Connecting youth to campuses not only enriches 4-H Science, but may also lead youth to picture themselves attending college in the future. The mystery is stripped away, and a college education may seem more accessible.

Opportunities abound on campuses for career exploration, Science Saturdays, summer workshops, conferences, camps, and so forth. Plan programs that will get youth into labs, provide opportunities to learn about and participate in on-going research and science activities, and allow them to make presentations (including poster sessions) to faculty, staff, graduate and undergraduate students. The key is to expose youth to ongoing science research *and* college life! The purpose of this chapter is to share promising practices to help develop and sustain successful 4-H Science programs in partnership with faculty, staff, and students at urban colleges and universities.

Promising Practices

The promising practices for *Partnering with Colleges and Universities and Campus-Based Scientists* are subdivided into four categories: (a) Program Planning and Evaluation, (b) Developing and Sustaining Partnerships, (c) Staffing, and (d) Training.

Program Planning and Evaluation

- Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental
 program planning and evaluation information required for successful 4-H Science programs. The information
 contained here is specific to working with colleges and universities and campus-based scientists to develop
 and deliver 4-H Science programs.
- 2. Utilize college/university conference services for assistance in planning on-campus programs. They are in the business of providing support for planning and logistics, and will assist in everything from food service to lodging. This is especially important if the program requires an overnight stay.





- *3. Include on-campus Science Saturdays.* This is a relatively easy way to get youth to campus. Science Saturdays can supplement existing science programs.
- 4. Tap into Collegiate 4-H to help facilitate on-campus programs. Youth enjoy interacting with college students. Collegiate 4-H members may need service projects, and may be more than willing to help with science programs. If a Collegiate 4-H program does not exist on the campus, consider starting one.
- 5. Arrange for urban youth to attend existing 4-H campus-based programs. Allow urban youth to feel they are part of a greater community by including them in existing programs, activities, and events.
- 6. Take advantage of resources developed or recommended by the University. Universities are a wealth of resources (research, curricula, volunteers, scholarships, labs, etc.).

Developing and Sustaining Partnerships

- 1. Read the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability. This introduction contains critical "overarching principles" that are vital to developing and sustaining program partners. The information included here is specific to partnering with colleges/universities and campus-based scientists.
- 2. Stay focused on 4-H Science program goals. A "golden" opportunity to partner with campus scientists will align with goals, needs, and current programming agenda (see also <u>4-H Science Program Design 4-H Science Checklist</u>).
- *3. Increase visibility of 4-H Science on campus.* The more people who know about 4-H science programs, the more likely to find the right partners. On-campus visibility will increase the pool of potential partners.
 - Attend relevant campus meetings and faculty-student mixers.
 - Create program fact sheets that can be readily shared with appropriate science faculty and staff.
 - Announce partnership opportunities and new program initiatives in campus and department newsletters.
 - Distribute announcements about new program developments (e.g., awards or recognition, new funding, major program accomplishments, youth successes, evaluation results, etc.).
- 4. Join informal science education and/or STEM networks or coalitions hosted by universities. These coalitions are often sponsored by the School or College of Education, and may provide opportunities to get sub-grants, cash support, and/or in-kind support for 4-H Science efforts.
- 5. Locate a champion at the college or university. Identify a faculty or staff member with similar interests to create a partnership. Universities can be daunting to engage with from the outside, but an inside source can provide much needed assistance, such as facilitating connections with his/her network. Potential connections and opportunities could be endless.
- 6. Gain support from the dean's office. Create opportunities for the dean to recognize and support faculty who participated in 4-H Science programs during the year (e.g., wine and cheese reception, acknowledgment in campus newsletter or campus-wide faculty event, etc.).



- 7. *Know which projects will interest faculty and campus-based staff.* Get to know science faculty and staff. Look for intersections between faculty/staff interests and current (and projected) 4-H Science programming.
 - Develop relationships with relevant science departments, and ask for time to present at department meetings.
 - Attend campus and community presentations by science faculty/staff.
 - Read campus and department newsletters and blogs to learn about the work of faculty members.
 - Become familiar with journal articles and publications by faculty in areas related to 4-H Science programs.
 - Meet with faculty individually or in small groups to discuss their work and any potential for collaboration.
 - Invite faculty to visit current 4-H Science programs to familiarize them with the content and audience.
- 8. Utilize college/university faculty, staff, and students as content rich volunteers. They can serve in a variety of ways (e.g., skillathons, workshops, facilitators, judges, advisory board members, geocaches, engineering days, trainings, etc.). For more information see <u>Staffing with Content Rich Volunteers</u>.
- 9. Recruit campus science faculty and staff as mentors. Campus faculty/staff can serve as mentors for independent youth science projects. They can support youth and their projects through electronic communication or face-to-face interactions/meetings.
- 10. Look for opportunities to partner with faculty on grants with a K-12 outreach component. More and more often, science and technology grants aimed at on-campus scientists also include a youth outreach component. Target scientists in fields that support current or projected 4-H Science programs, and develop relationships before grant announcements are released.
- 11. Partner with faculty on curricula/program development. This is especially effective when the 4-H Science program has identified a need in the field and can work with campus faculty to generate appropriate materials.
- 12. Contact the person in the dean's office responsible for student recruitment and orientation programs.
 - The recruitment officer may have university giveaways available for your participants, and will be more than willing to speak to the youth about the college or university.
 - Ask whether the college or university has a program that targets educationally and/or economically disadvantaged high school youth (see *Educational Opportunity Fund* in *Resources* below). Current college students in these programs may help facilitate 4-H campus-based programs and/or serve as mentors to the 4-H participants. They are a great resource to discuss admissions, financial aid, and other items with participants.
- 13. Cultivate relationships with student groups/organizations. Student groups/organizations often look for service opportunities in their community. Develop a working relationship with faculty/staff advisors, as they usually serve for multiple years and will offer better continuity than only working with the students.

Staffing

- 1. Advertise on-campus for student interns and AmeriCorps Members. They can provide staffing for afterschool, summer, and club programming. Students may need to fulfill university service-learning requirements, or they may need field experiences if they are in a teacher education program. Some students may just want to add experience to their resume. (See also <u>Staffing with Americorps Members</u>).
- 2. Utilize college and university job placement resources. All colleges and universities will have some kind of job placement service for students. Call or visit the office to learn how to best use this resource.
- 3. Develop and mine relationships with graduate faculty. Often, relationships with faculty can lead to interns (undergraduate and graduate students).

Training

- 1. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an indepth discussion of promising practices for training staff and volunteers. The promising practices contained here are geared specifically to working with college and university staff to deliver 4-H Science programs.
- 2. Provide campus scientists with clear expectations for teaching/facilitating youth programs. It is critical that campus-based scientists get the training and support needed to ensure successful interaction with youth audiences. Help them understand that a PowerPoint/lecture format in a large lecture hall will not win youth over to the sciences. Assist them in creating hands-on demonstrations and activities with a high degree of youth appeal.

Case Studies

Arnett – Engaging a Local, Non-LGU in 4-H Programming. Adventure Central is a partnership between Ohio State University (OSU) Extension 4-H and Five Rivers MetroParks. Due to its location in Dayton, Adventure Central's primary university partner for programming efforts is the University of Dayton – not OSU, the LGU located 70 miles to the east. Leadership at Adventure Central has involved the University of Dayton in three ways.

- <u>Environmental Instrumentation Lab:</u> EIL is a capstone semester course designed to give University of Dayton science students hands-on experiences in the field using lab equipment and techniques to study current environmental issues. EIL students work with Adventure Central youth to assess the Wolf Creek watershed through water quality monitoring and discuss how the watershed relates to their lives. 4-H youth visit the University of Dayton to learn about college life and career opportunities. They tour a lab on campus, meet with professors, and create a presentation about their watershed findings and their learning experiences throughout the semester.
- <u>Neighborhood Schools Center</u>: Adventure Central partnered with the University of Dayton's Fitz Center to
 provide leadership for an outreach afterschool program at Fairview Elementary, one of the Neighborhood
 School Center sites with Dayton Public Schools. About 30 college students worked with the Adventure Central afterschool program each year. They provided help with homework and science projects, and assisted
 a club of 10-12 youth over the academic year with weekly science activities.
- River Leadership Curriculum: This is a current student project to deliver an outreach educational program



regarding the Wolf Creek watershed that runs through the park at Adventure Central. It will be a collaborative process as part of a course at the University of Dayton that will yield staff development and youth programs in support of the summer day camp. –**Nate Arnett, The Ohio State University**

Davis-Manigaulte – Collaborating with Campus-Based Faculty to Develop 4-H Curricula. The College Achievement through Urban Science Exploration (CAUSE) project serves as a model partnership between 4-H and campus-based scientists. In collaboration with university faculty, 4-H has developed curricula such as *Grow with the Flow, Gardening in the City,* and most recently the draft curriculum for the CAUSE project. The curriculum development process for *Grow with the Flow* involved creating a project plan with a series of lessons based upon the core concepts of the project. 4-H worked with graduate students and Extension staff to identify sites throughout the state for piloting the curriculum (gathering feedback; modifying lessons; and proofing/editing by field staff, teachers, youth workers, and volunteers).

The CAUSE curriculum has been piloted once and is in the process of being revised during the second year of program implementation. Pre-post evaluation tools have been developed and are being administered as planned. A faculty advisor provided guidance and input to a graduate student throughout development of the initial version of the curriculum and provides ongoing input, communication, and encouragement for the students and overall project. The faculty advisor also serves as a resource – referring other faculty members and agency leaders to explore other projects that might be developed to build upon current 4-H Science initiatives. In addition, collaborating faculty have invited Extension faculty/staff to present joint workshops at state and national conferences. –Jackie Davis-Manigaulte, Cornell University

Martin – Partnering with a STEM Coalition and College of Engineering for Summer Camps. Summer programs using the *Engineering is Elementary* (Museum of Science, Boston) curriculum are part of the Corridor STEM Initiative, in partnership with the K-12 Coordinator from the College of Engineering at the University of Iowa. The Corridor STEM Initiative (CSI) is aimed at engaging Iowans to help shift the culture and mindset around math, science and technology. The CSI program is sponsored by local businesses; the Grant Wood Area Education Agency; school districts; and colleges and universities, including Iowa State University Extension in Johnson County and the University of Iowa College of Engineering. In 2007, as a result of planning by the CSI out-of-school committee, the University of Iowa was awarded a \$25,000 grant through the Roy J. Carver Charitable Trust. The K-12 Coordinator and ISU Extension of Johnson County developed plans for Engineering is Elementary (EiE) programs.

ISU Extension science resources were combined with the EiE curriculum for the summer experiential science program. The Engineering is Elementary program goals are to: (a) increase youth's understanding of technology and engineering in everyday life, (b) teach youth to enhance and apply their knowledge in technology and engineering through hands-on experiments, (c) encourage youth to read books that enrich their understanding of these areas, (d) connect learning about these areas in summer programming with learning in the school setting, and (e) increase awareness among youth and their families about career opportunities in technology and engineering. The EiE science programs follow two formats: (a) three-hour weekly sessions for 10 days, or (b) two-hour weekly sessions for six weeks. The youth participants are 7- to 11-year-old youth; the target age is youth completing third and fourth grades. More than 300 youth have participated in the EiE camps during the last 3 years. **–Janet Martin, Iowa State University**

Ripberger – University Community Engages Youth on Campus. Since 2009, New Jersey 4-H has collaborated





with professors, staff, and students at the Rutgers School of Environmental and Biological Sciences to provide a weeklong residential science program for high school youth from urban communities throughout the state. Started with funds from an internal Extension grant, the Rutgers 4-H Summer Science Program was created to help address the underrepresentation of minority populations in the sciences. Through participation in the program, high school youth:

- Learn more about science, explore research occurring on campus, and gain a better understanding of opportunities available in science, engineering, and technology.
- Explore opportunities at Rutgers University, experience campus-life, and learn about post-secondary education.
- Prepare to serve as 4-H Science Ambassadors in their home communities. As a 4-H Science Ambassador, youth work with local 4-H staff to provide science programs to younger youth in afterschool and summer camp settings.

The State 4-H Science Agent, Janice McDonnell, recruits, trains, and recognizes the campus scientists for their role in the program. Faculty, staff, and students from the Equine Science Center, the Center for Remote Sensing and Spatial Analysis; the Institute of Marine and Coastal Sciences; and the Departments of Animal Sciences, Biochemistry, and Food Science have participated in the program's first two years. In addition to hands-on learning activities in a variety of sciences, youth get a feel for what it is like to live on campus. Mid-week, they also interact with an assistant dean and a panel of undergraduate and graduate students at an evening social. At the end of the week, youth work in teams to create and present posters about a science area of interest to administrators, faculty, family members, and other guests prior to a closing luncheon hosted by the school's dean. Currently, Tyco International, a corporation with youth achievement as part of its mission, is serving as the primary funding partner. **–Chad Ripberger, Rutgers University**

Resources

Educational Opportunity Fund (EOF) – The New Jersey EOF is one of the nation's most comprehensive and successful state-supported efforts to provide access to higher education for economically and educationally disadvantaged youth. The EOF assists low-income residents who are capable and motivated but lack adequate preparation for college study. Helping students succeed and graduate, the EOF supports a wide array of campus-based outreach and support services at institutions. Available at <u>http://www.nj.gov/highereducation/EOF/</u>.

Partnering with Science Centers and Museums

Introduction

Local science centers and museums are tailor-made partner organizations for 4-H Science programs. Science centers and museums have the capacity to provide a wealth of resources (including space for programs and events), and are a stellar source for recruiting content rich volunteers. Partnering with science centers and museums helps to develop a positive perception of 4-H and the relevant science programming 4-H provides youth.

It is important to recognize that science centers and museums are not always "labeled" as such. They can include: botanical gardens, working farms, zoos, nature centers, and so forth. The Association of Science-Technology Centers has a searchable directory of centers (see *Resources* below). The purpose of this section is to provide practical information and ideas for developing and sustaining successful partnerships with science centers and museums.

Promising Practices

The promising practices for *Partnering with Science Centers and Museums* are subdivided into three categories: (a) Program Planning and Evaluation, (b) Developing and Sustaining Partnerships, and (c) Museum Resources.

Program Planning and Evaluation

- 1. Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to partnering with science centers and museums to deliver 4-H Science programs.
- 2. Take advantage of the trend in the science center community to support ongoing groups. Science centers and museums are doing more programmatic outreach (beyond the walls of their facilities), and are providing space at the centers for groups to use, including OST organizations (summer and afterschool).
- 3. Partner with science centers on National Science Foundation (NSF) Informal Science Education (ISE) grants. Science centers and museums are seeking partner organizations to involve youth in long-term programs.
 - Partner with the science center from the beginning of the proposal process to ensure the 4-H Science program's interests and contributions are adequately represented.
 - Include funding for program supplies, transportation, staff time, and any other additional resources needed.
- 4. Match 4-H Science program interests with exhibits at nearby science centers and museums. Procure the schedule of featured exhibits as soon as it is available to help plan relevant field trips.
- 5. Work with science centers and museums to involve teen leaders. This is a great way to engage older youth in the sciences. Teens can serve as either volunteer or paid staff (see <u>Staffing with Teenagers and Teens as</u>





<u>Cross-Age Teachers</u>). Consider establishing a teen group whose members serve as museum summer camp counselors, docents (tour guides), and so forth. It is likely that at least a few day campers will aspire to one day join the museum teen club!

Developing and Sustaining Partnerships

- 1. Read the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability. This introduction contains critical "overarching principles" that are vital to developing and sustaining program partners. The information included here is specific to partnering with science centers and museums.
- 2. Find opportunities to join informal science education coalitions. This can be an excellent source of potential science center and museum partners. In addition, the opportunity to help shape informal science education in the community is priceless.
- 3. Support relevant science center and museum activities, regardless of partnership status. Publicize activities that support curricular or programmatic goals. Involve club members and program participants in the activities as well (e.g., robotic events, Engineering Day, etc.). This increases 4-H Science visibility with potential partners and demonstrates willingness to provide support to other organizations.

Museum Resources

- 1. Host meetings and events at science centers and museums. Science centers and museums usually have community meeting space, storage space for science equipment or kits, and so forth. Consider using center space for 4-H science club meetings, sleepover events, or for contests and skillathons. Science centers and museums are also a great venue for science program showcases, volunteer recognition events, and science staff/volunteer trainings.
- 2. Tap into museum staff and volunteers for their content rich expertise. They may welcome additional opportunities to engage others in the sciences (see *Martin* in *Case Studies* below).
- 3. Use inquiry-based science center and museum developed resources to fill curricular gaps. Several science centers and museums have developed outstanding, research-based, developmentally appropriate youth science curricula. Consider their offerings when reviewing curricula for possible inclusion in 4-H Science programs (see *Inquiry Based Learning Approaches*).
- 4. Utilize the kit-making capacity of science centers and museums. Many science centers and museums have dedicated staff available for assembling kits for use in science programming. These facilities may be able to store the kits for future use.

Case Studies

Francis – 4-H and Science Center Complement Resources to Better Serve OST Programs. Utah State University (USU) Extension 4-H and Thanksgiving Point Institute, a private not-for-profit organization, created a youth education partnership to provide quality hands-on discovery experiences for youth. Located in the heart of the population of Utah, Thanksgiving Point includes a fossil museum, a botanical garden, and a working farm. The youth programs include afterschool programs, summer day camps, a Junior Master Gardener[®] 4-H club, a teen leadership 4-H club, and field trips. Started over 10 years ago, the partnership continues to grow as both orga-



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72 Partnerships, Resource Development, Program Growth and Sustainability
nizations recognize new program opportunities. Both partners work collaboratively in developing programs and pursuing external funds. USU Extension 4-H provides professional staff time and cost sharing of an onsite Youth Education Coordinator. Thanksgiving Point provides facilities, class/camp promotion, and hourly paid staff to assist with program delivery. 4-H benefits through its access to amazing facilities and promotion efforts by the museum. Thanksgiving Point benefits by linking their programs to the credibility and ongoing research of a major land grant university. **–Dave Francis, Utah State University**

Martin – 4-H Afterschool Aerospace Training Takes Flight at Local Museum. As part of the Corridor STEM Initiative in eastern Iowa, 4-H collaborated with the Iowa Children's Museum and the Grant Wood Area Education Agency to lead "Take Flight," an educational workshop for afterschool providers. Forty afterschool program providers from 10 sites participated. The two-hour program included: Principles of Flight, by a professor from the University of Iowa; STEM in the Afterschool Program, by the Teacher in Residence from the Grant Wood AEA for the STEM Initiative; the "Take Flight" exhibit in the museum by their staff; and 4-H Afterschool Aerospace Resources by Martin, the 4-H Specialist. Each of the 10 sites received a "tub of resources" including a paper rocket launcher built by the museum staff; the book *Science Is . . . : A sourcebook of fascinating facts, projects and activities* by Susan V. Bosak; and hands-on flight items from the museum store. **–Janet Martin, Iowa State University**

Resources

Association of Science-Technology Centers – an organization of science centers and museums dedicated to furthering public engagement with science among increasingly diverse audiences. For informal learning publications and professional development opportunities, or to find a science center near you, visit <u>http://www.astc.org/ index.htm</u>. For information specific to youth involvement in science centers, see <u>http://www.astc.org/resource/</u> <u>youth/index.htm</u>.

Designing Partnerships Between Science Centers and After-School Programs: Lessons from Design It! Engineering in After School Programs – this document introduces informal science educators to a new partnership model based on lessons learned during a 3-year national pilot project to support collaboration between six urban science centers and over 30 community-based afterschool programs. The collaboration tested and refined an innovative curriculum challenging children to building working models of small functional machines and toys and to practice crucial elements of the design process. Available at <u>http://www.eric.ed.gov/</u>.

State Level Practices to Advance Urban Programming

Introduction

4-H Youth Development programs traditionally are not staffed to serve youth in urban communities. The predominant county model has been one 4-H professional per county (in some counties, both the agriculture and family and consumer science educators deliver relevant 4-H youth development programs). These professionals have provided traditional programming to rural and suburban youth for decades. Position descriptions for 4-H faculty and staff have focused upon the traditional 4-H professional – someone to manage volunteers, organize and run a club program, county fair, and other events. Positions often have been filled by former 4-H members, also from a "traditional" 4-H background.

At some point, county 4-H professionals recognized the long-overlooked need to bring quality youth development programs to urban youth. The challenge, however was how to meet this need when few state or regional offices across the country were prepared to support urban youth programs. Many counties have risen to the challenge, and are striving to develop and implement urban Extension programs on par with traditional Extension programming. *The underlying assumption for this chapter is that most current urban programming is the result of an organic (bottom-up) approach to program development*. What seems to be lacking in many areas, however is a strategic "top down" approach to supporting urban Extension programming.

The 4-H Science professionals who collaborated on this volume are a diverse mix, yet they have two things in common: (a) they are passionate about and committed to providing urban youth with quality 4-H Science programs, and (b) they concur that the degree of programming success for any sustained urban initiative is directly related to the state's level of commitment, and the practices and policies in place to support urban programming efforts.

Many 4-H youth development professionals engaged in urban programming have reported feeling isolated within their institutions, as well as within traditional state 4-H programs or with their 4-H colleagues. This seems to be particularly true in states that still support relatively large rural/suburban areas. There is, therefore a compelling need for the creation of local, state, and national communities of practice to support urban 4-H agents and educators.

Ultimately, for 4-H Science programs to successfully meet the needs of urban youth there must be administrative (state level) support for the programs *and* the 4-H staff and volunteers who develop and implement them. The purpose of this chapter is to outline key state level practices for advancing urban 4-H Science programming.

Promising Practices

The promising practices for *State Level Practices to Advance Urban Programming* are subdivided into five categories: (a) Philosophy, (b) Institutional Support for Urban Programming, (c) Statewide Partnerships, (d) Program





Planning, and (e) Staffing.

Philosophy

- 1. Develop vision and mission statements to support 4-H urban Extension programming. It is important that the differences (philosophical and operational) between urban and traditional programming are recognized. While they are different, urban programming complements traditional extension programming. A carefully crafted vision and mission statement will create cohesion between traditional and urban extension programs and personnel and can lead to integrating urban programming into the core of the Extension mission.
- 2. Define the "urban" issue. While most extension professionals understand that urban programming is different, it is sometimes hard to clearly articulate what "urban" means. Many of the factors that make an area urban are shared by suburban and rural communities (e.g., socio-economic and cultural isolation, disenfranchised communities, concentrated poverty, etc.). Often people confuse "urban" with "big" a "big" city is urban, a small city is not. A city with a population of 50,000 may, however face the same challenges as a community within a city of six million.
- 3. Recognize that a 4-H "urban" extension office serves the state, not just a particular geographic region. The purpose of an urban office (center, department, urban specialist, etc.) should be to create models that can be replicated in other areas with similar issues, ideally in a way that will help position 4-H as a leader in urban youth development efforts in the state (and across the nation).

Institutional Support for Urban Programming

- 1. Develop statewide support for urban programming "from the top." The Extension director's office and the state 4-H program leader's office must make serving urban audiences a priority. Support for urban programming must be explicit and sincere, and include resources to back the efforts of those working in these communities. Extension administrators must commit to:
 - Identifying and supporting strong leadership; someone with access to the director's office better yet someone from *within* the director's office.
 - Providing mini-grants to seed innovation in this area; to help urban programs develop partnerships and become sustainable.
 - Supporting professional development for urban 4-H agents/educators/staff; including involvement in the Urban Extension Conference sponsored by the north central region, or other professional development opportunities related to urban programming.
 - Developing and sustaining urban programs outside of Children, Youth, and Families at Risk (CYFAR) supported projects and sites.
 - Ensuring equal opportunity (scholarships, awards, etc.) for urban youth to participate in state and national youth conferences, trips, camps, and so forth.
- 2. Integrate urban programming into existing Extension, 4-H, and Department committee structure(s). Help those working in urban communities develop a community of practice to share and discuss their work and to plan multicounty and/or statewide urban programs.





- 3. Communicate the value of urban programming efforts to everyone. The move to non-traditional, urban programming may meet with some resistance, as people may naturally fear this will translate to a corresponding move away from serving traditional audiences.
 - Reassure traditional clientele who may or may not see the importance of these initiatives by emphasizing that urban programming benefits *everyone*.
 - Highlight urban programming efforts at state Extension board meetings, on the state Extension website, in the statewide Extension annual report, and so forth.
 - Partner with Extension and university offices of communication to promote urban initiatives.
 - Involve urban stakeholders on state Extension boards and advisory groups.
- 4. Demonstrate institutional support by recognizing urban programs and professionals. University officials, Extension administrators, and 4-H department heads and/or program leaders can show support by:
 - Attending youth program showcases.
 - Nominating urban programs and program staff for state and national awards.
 - Creating special "urban" awards for programs and practitioners.
 - Including "urban efforts" in a special section of newsletters, annual reports, websites, and so forth.

Statewide Partnerships (internal and external)

- 1. Read the <u>Section Introduction</u> to Partnerships, Resource Development, Program Growth and Sustainability. This introduction contains critical "overarching principles" that are vital to developing and sustaining program partners regardless of scope or venue.
- 2. Develop partnerships within urban communities. It is vital to develop and sustain relationships with urban communities and individuals in order to create a solid base of support for developing and carrying out urban programs.
- 3. Bring together state level organizations and agencies who may be interested in multicounty, area, or statewide partnerships. At the state level, identify statewide organizations with similar missions that are also located in urban areas throughout the state. In partnership with these organizations, develop demonstration sites that may be replicated in other cities.
- 4. Facilitate grant proposal development among urban 4-H professionals. Provide support for urban 4-H professionals to collaborate on large grant proposals and programs for statewide (multicity) efforts.

Program Planning

- 1. Engage in strategic planning from the start. Use the logic model to drive state 4-H Science program development and evaluation. Customize the model to fit each program, with a focus on outcomes.
- 2. Focus on program development as opposed to replicating traditional programs. Bringing 4-H Science programming to urban youth audiences is not simply a matter of duplicating existing programs. If it were that

simple, this guide would not be necessary!

- Develop new models for working with the diversity of audiences, situations, and challenges found in urban areas.
- Create multicounty and/or statewide initiatives that target and support urban communities such as NPASS2, 4-H Summer Science, and so forth (see *NPASS2* and *Summer Science in Case Studies below*).
- Focus on building the capacity of community volunteers and paraprofessionals to deliver and support science programs.

Staffing

- 1. Implement changes in staffing patterns to reflect population needs. Plot current staffing patterns on a large state map, and compare to areas that face urban challenges. Most states will need to change the way faculty and staff are located throughout the state (both in density of placements and their physical location) in order to adequately support urban programming.
 - Locate urban professionals in or near the urban communities they serve to facilitate access. County offices often are not situated in the county's population center. Urban partners may be willing to provide office space for Extension partners.
 - Hire additional professionals or program associates to focus solely on the urban communities within a county. This focus is necessary in order to develop and sustain urban partnerships, resources, staffing, and programming.
- 2. Recruit a diverse workforce. Urban 4-H professionals and paraprofessionals should be as representative of the urban communities served as possible. Commit to providing any training necessary to help community members develop skills needed to fill open positions.
 - Develop strategic position descriptions (e.g., skills needed in an urban program, tasks, responsibilities, etc.) that are unique for urban positions.
 - Advertise urban positions broadly to a variety of communities, and think beyond the typical avenues.
- 3. Evaluate urban professionals based on the uniqueness of their position descriptions and programs. Many standards/benchmarks for evaluating county 4-H programs are based on traditional, volunteer-driven, community-based club programs. Criteria for evaluations should be outlined at the same time position descriptions are developed.

Case Studies

Russo – Urban 4-H Office Created to Develop Program Models for Underserved Youth. In 2004, the youth development program of the University of Minnesota Extension received funds to start and support a Minnesota Urban 4-H Youth Development Office (Urban 4-H), in order to expand 4-H's capacity to engage Minnesota's underserved youth. Though programs are concentrated in the Twin Cities area, Urban 4-H collaborates with colleagues across the state to find ways of expanding programming to reach youth across diverse geographic areas, languages, cultures, and religions. STEM has offered many opportunities to do this, through collaborative grants and initiatives (e.g., CYFAR and National 4-H Mentoring grants), and interdisciplinary funding for a University 4-H STEM specialist.





The Minnesota Urban 4-H Youth Development Office works with and on behalf of youth living in Minneapolis, St. Paul, and the surrounding communities to measurably improve their learning and leadership through educational programs and applied research. The purpose of Urban 4-H is to contribute to the field of youth development by developing, piloting, and sharing successful models of improving the learning and leadership of urban young people, particularly those youth who live in at-risk conditions. The ultimate goal is to support high-quality, engaging programming for urban youth to drive their current and future success by experiencing mastery, building 21st century leadership skills, and developing a sense of global citizenship. The critical issue that drives our work is the need of youth, particularly those from low-income communities (regardless of geographic location), to learn how to overcome economic, educational, and social barriers, including barriers to STEM career paths.

Urban 4-H works with youth, families, volunteers, interns, and community-based organizations to co-create outof-school time (OST) Urban 4-H clubs focused on youth-led learning experiences in the areas of STEM, citizenship, and healthy living. The program model begins with youth, family, and community partnerships. Urban 4-H operates through a highly integrated leader support system consisting of program and strategic planning support of partners by Urban 4-H staff, an intern and volunteer program that carries out the delivery of youth clubs, and a training and support program designed to give a common foundational base of development for Urban 4-H partners. With this support system in place, Urban 4-H youth master their learning through meaningful reflection along with real opportunities to connect their skills and interests to careers and higher education. **-Jessica Russo, University of Minnesota**

Ripberger - New 4-H Department Committee Brings Focus to Urban Programming. The Rutgers 4-H Youth Development Department established an urban programming committee in 2008. The purpose was to develop a community of practice for the increasing number of urban 4-H professionals in the state, given the recent hires in the densely populated counties between Philadelphia and New York City. Many of the new hires work in cities within counties that already have an agent. Relative to the rest of the state, those located in urban centers are more likely to have significant programming efforts through collaborations with afterschool and summer program providers. This committee, as part of the department's core structure, has not only provided an opportunity for these professionals to learn from one another, but also to work together on multi-county 4-H Science projects targeting youth from urban communities. In 2008, a subgroup of the Urban Programming Committee received a three-year, \$150,000 grant from the Extension Director's office to boost the level of OST STEM programming in Camden, Hackensack, Paterson, and Trenton. This four-county collaboration led to the annual Rutgers 4-H Summer Science Program and NJ 4-H's participation in the National Partnerships for After School Science (NPASS2) program led by the Center for Science Education at EDC. Through NPASS2, 4-H is leading a statewide OST science professional development effort targeting urban afterschool programs. **-Chad Ripberger, Rutgers University**

Resources

Urban Extension Conference - this bi-annual conference, sponsored by the north central region, targets Cooperative Extension staff who work in urban communities. Participants build strategic partnerships, identify strategies to enhance the resource base for urban programming, capture best practices of urban Extension, and explore emerging issues. Available at <u>http://www.dce.k-state.edu/conf/urban-extension/</u>.

Staffing with Content Rich Volunteers

Introduction

Staffing with content rich volunteers brings "richness" and depth to 4-H Science programs. Many people who either work as science professionals or enjoy science-based hobbies would love to share their knowledge with others, but have found few volunteer opportunities available that capitalize on their specialized skills and interests. Partnering with these scientists can be a win-win scenario for all parties.

Traditional 4-H agriculture programming was built upon a solid partnership between 4-H and agricultural scientists at land grant universities. Twenty-first century 4-H Science programming needs to build these same kinds of partnerships. Today, however, it is not enough to rely upon the land grant university system. Program planners need to make concerted efforts to engage both science professionals and serious science hobbyists to create a sound infrastructure for youth science programs.

The purpose of this chapter is to help youth science program planners maximize their ability to recruit and sustain content rich volunteers. One point that cannot be overemphasized is that there are a variety of ways these science volunteers can be utilized – from one-shot speaking engagements to longer term service on advisory boards. It is important to think beyond the traditional club leader role when planning to engage content rich volunteers.

One final caveat: Scientists have cool *toys* (e.g., lab coats, goggles, computers, nets, GPS units, etc.), *workplaces* (e.g., laboratories, energy plants, wetlands, oceans, hydroponic gardens, observatories, research centers, etc.), and even *travelling exhibits* (e.g., soil tunnel, GPS/GIS mobile labs, robotics). Youth are instantly engaged – because scientists can make learning fun!

Promising Practices

The promising practices for *Staffing with Content Rich Volunteers* are subdivided into three categories: (a) Program Planning and Evaluation, (b) Recruitment, and (c) Training and Support.

Program Planning and Evaluation

- 1. Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to staffing with content rich volunteers.
- 2. Build an infrastructure to actively support recruitment of content rich volunteers. Create science advisory boards to assist with 4-H Science programming. For example, create a Science and Technology Program Development Committee as part of the county's local 4-H Program Development Board to target recruitment of content rich volunteers for structured opportunities (e.g., clubs, speaker's bureau, events, etc.).





- 3. Know which roles content rich volunteers can play to enhance the program. It is critical to design programs and events to capitalize on content rich volunteers before you begin the recruitment process. Failure to do so creates confusion on the part of the volunteer, and may result in negative or adverse feelings about the program. At minimum, program/event planners should clearly articulate (preferably in writing):
 - Need for the program,
 - Program implementation plans and evaluation criteria,
 - Recent outcomes and successes,
 - Volunteer responsibilities (e.g., duties, time commitment, etc.), and
 - Role of volunteer supervisors.
- 4. Recognize there are roles available beyond "traditional club leader" or "teacher/facilitator." There are countless opportunities to involve content rich volunteers (e.g., presenters, judges, board members, etc.).
 - Invite them to join special interest committees, advisory boards, and so forth.
 - Engage them in the initial project or event planning process.
 - Provide opportunities for them to exhibit or host activity stations at events that bring science to the youth and/or community (e.g., Community Day, Robotics Events, 4-H Field Day, Earth Day, Recycling Awareness Day, etc.).
 - Include a Science Street Fair as part of your State Fair and invite science professionals, businesses, and hobby groups to participate.
- 5. Familiarize yourself with local scientific societies and professional organizations. Many have existing educational outreach projects. This is a great way to help build a relationship in the beginning, and has the potential to lead to guest speakers, judges, advisory board members, and so forth.
- 6. Provide opportunities to involve funders in program planning and implementation. There is a growing trend for corporate sponsors and contributors to want to do more than just provide monetary support or donate supplies. They want their employees actively involved in meaningful ways in the programs they support.

Recruitment

- 1. Prepare your message in advance. Know what you want to say. At the very least include:
 - The need to train and prepare future scientists, because this is usually a known and hot-topic for individuals with STEM backgrounds;
 - A *brief* description of the program, the need for the program, the role(s) available for potential volunteers, and time commitment required;
 - Assurances that appropriate training and support will be provided; and
 - Current outcomes and successes as well as the meaningful impact expected by what the volunteer(s) will do.

- 2. Look for content-rich volunteers who enjoy working with young people. The old adage continues to hold true: "They don't care what you know, until they know you care."
- *3. Start recruiting "where you are."* Content rich volunteers may be literally in your backyard.
 - Use existing content-rich volunteers to recruit new ones. Current volunteers can return to their workplace or organization and share the positive experiences they had volunteering with 4-H. Use program planning promising practices (above) to ensure the volunteers have a solid, positive experience.
 - Target 4-H alumni. They know and appreciate 4-H Science programs and have lots of skills and enthusiasm to share.
 - Mine personal connections, such as relatives, neighbors, the local pharmacist, and so forth.
- 4. Leave your recruiting "comfort zone." It is necessary to step out of the confines of the 4-H Program to recruit content rich volunteers. Fortunately, there are many places to find them:
 - Science-related businesses and professionals (e.g., utility companies, hospitals, veterinarians, pharmacists, etc.);
 - Educational institutions, research institutions and facilities (e.g., land grant universities, technical colleges, etc.);
 - Local, county, and state government/public agencies (e.g., resource conservation districts, waste management, departments of environmental quality and natural resources, etc.);
 - Local branches of professional associations and societies (e.g., The Society of Women Engineers, Geoscience Information Society, Alaska Robotics Education Association, etc.);
 - Retiree organizations (e.g., American Association of Retired Persons, Alliance for Retired Americans, Retired Teachers' Association); and
 - Science hobby groups (e.g., geocaching/geospatial, robotics, rocketry, film-making, etc.).
- 5. Recruit at community events. There are a multitude of events geared toward youth and their parents throughout the year in most communities (e.g., Water Awareness Days, Children's Day in the Plaza, school events, Master Gardener Educational Events, etc.).
 - Host a booth with activities and recruitment information.
 - Remember that events aimed at children and youth can reach parents or other significant adults who attend.
 - Take time to visit other booths. There may be other adults participating in the event who would welcome the opportunity to volunteer.
- 6. Get the word out in appropriate venues about volunteer opportunities. Advertise for specific opportunities and program needs in trade publications; talk to chambers of commerce; make presentations to employee groups (Lunch & Learn); send eBlasts (electronic newsletters) to advisory groups, current and former volunteers, current and former program participants, and so forth.





- 7. Connect the 4-H Science program's mission to the volunteer's personal or organizational mission. Develop relationships around a shared interest.
 - As a potential volunteer observes that his/her vision aligns with the program, she/he is more likely to invest time and resources into the program.
 - Professional organizations are also concerned about growing the next generation of science professionals, and will want to help meet this future need.
- 8. Research the employee volunteer practices of local science-based corporations. For example:
 - Does the company provide release time for their employees to volunteer with other programs?
 - Does the program need prior approval to qualify for support?
 - Does the company provide funding to organizations their employees volunteer with after a specified number of volunteer hours have been completed?

Training and Support

This section contains information specific to training and supporting content rich volunteers. *All* volunteers need appropriate training in positive youth development (PYD) principles, science processing skills, the experiential learning cycle, developmentally appropriate practices, and science inquiry regardless of content knowledge levels.

- 1. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers. The promising practices contained here are geared specifically to training and supporting content rich volunteers.
- 2. Offer volunteer development opportunities. It is important to provide content rich volunteers with as many opportunities and experiences as possible to increase successful outcomes.
 - Include discussion about PYD as often as possible. Content-rich volunteers may have little to no previous exposure in this area.
 - Teach volunteers how to frame their knowledge and skills in an age appropriate manner, and how to locate and/or use age-appropriate curricula and activities. A solid content piece will prove ineffective if the facilitator does not understand the unique needs of young people.
 - Encourage science professionals to bring their toys (tools) from work when they will be working with the youth. Such props are virtually guaranteed to engage youth interest, and will ease any anxiety the presenter may have.
- *3. Steward content rich volunteers.* Think of content rich volunteer involvement as a donation, and steward volunteers just as you would a donor.
 - Develop ongoing relationships with volunteers through recognition, accountability, and communication.
 - Acknowledge contributions, follow through with program plans, and share program successes.
 - Continue to initiate contact with volunteers (thanking them for service) even after program is complete. There may be opportunities for future engagements.

Case Studies

Enfield – Targeted Recruitment of STEM Professionals and Enthusiasts. The 4-H SLO (San Louis Obispo) SCIENTISTS Program from the start has been very intentional about stepping away from the usual recruitment modes, and has worked hard to reach people in science, technology, and engineering organizations, businesses, educational institutions, research institutions and facilities, public agencies, and other venues. The program has used letters and flyers; called individuals; presented at professional society meetings and luncheons; met with presidents, department heads, CEOs; and engaged in media campaigns for specific 4-H SLO SCIENTISTS facilitator recruitments. Some volunteers have been facilitators for over five years, and one former electric company employee is in his 11th year as a facilitator. The following companies/agencies/professions were targeted for volunteer recruitment, along with many others: the electric and gas companies; Air Pollution Control District; Regional Water Resources Board; local colleges and universities; staff and members of relevant clubs (e.g., Society of Women Engineers); Resource Conservation Districts; High-tech Companies; pharmacists, veterinarians, and health technicians; and retiree organizations and professional societies. **–Richard Enfield, University of California**

Nichnadowicz – Corporate Scientists Enhance Summer 4-H Program. As part of the Summer Science Program, science professionals are recruited to share their careers with youth. The science professionals are from the corporation that funds the program. Over the years a variety of scientists have visited the day camps, including chemists, biologists, and technicians who care for lab animals. Anyone who likes science and youth is welcome to visit the camp sites. When the scientists visit, they illustrate their jobs in many unique and often entertaining ways. Science professionals are recruited to visit the sites through the company's community outreach department. Two months before volunteers are needed, the company is emailed a news release about the upcoming opportunity. It states when and where volunteers are needed and how 4-H can help science professionals share their occupations with young people. The company then distributes this to its employees via email. This outreach usually nets about five volunteers each year. Program staff support the scientists with youth development and group management principles. –Jim Nichnadowicz, Rutgers University

Rudolph – Experts from Public Science Agencies Support Annual SET Expo. The 2010 Teens and Tweens Empowerment Conference is the annual event for the Teens Making Impact Extension (TMI) team project. The TMI program promotes positive youth development by focusing on life skills, career education, communication, and civic engagement. More than 160 youth and adults participated in the event packed with educational and funfilled activities. The theme was "Exploring Health and Fitness, Science, Engineering and Technology," and the conference began with the Science, Engineering and Technology Expo. Exhibits and mini workshops were led by staff members from NASA's Marshall Space Flight Center, Unmanned Aircraft System in Huntsville, the Defense Intelligence Agency, and faculty and staff from Alabama A&M University (Departments of Physics, Forestry, and Family and Consumer Sciences).The conference featured a number of content rich volunteers. For instance, forensic Science workshops were taught to older youth by Dr. Lonnie D. Ginsberg, who is responsible for the daily operation of the Huntsville Regional Crime Laboratory and the Florence Satellite Crime Laboratory. **–Danielle Rudolph, Alabama A&M University**





Resources

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to support 4-H Science programs. Includes a section on *Recruiting and Developing 4-H Science Content Rich Volunteers* – complete with training guide, sample volunteer position description, and 12 tips to successful content rich volunteers. Available at <u>http://www.4-h.org/Professional-Development/Content/Science/Implementation/Recruiting-and-Developing-Volunteers/</u>.

Staffing with AmeriCorps Members

Introduction

AmeriCorps can be a wonderful resource for staffing 4-H Science programs. Perhaps one of the most important roles AmeriCorps members can play is the generation of volunteers. Most members serve in local, community-based organizations, expanding organizational capacity to achieve their mission and building community involvement and support. Other ways members help include improving and expanding the quality of services and raising awareness of the organization in the community. Organizations that are awarded AmeriCorps grants are responsible for recruiting the AmeriCorps members to serve in their program. AmeriCorps grants partially cover the expense of operating an AmeriCorps program and do not cover general organizational expenses. A cash and in-kind match is required.

There are three types of AmeriCorps programs:

- 1. AmeriCorps VISTA was designed specifically to fight poverty in low-income communities. AmeriCorps VISTA members are focused on capacity-building; they do not engage in direct service provisions. AmeriCorps VISTA members recruit and manage volunteers, improve and expand the quality of services provided, raise awareness of the sponsoring organization in the community, seek external funding for program, and so forth. A consistent goal for every AmeriCorps VISTA project should be the sustainability of the project by the sponsoring agency and the low-income community after AmeriCorps VISTA project sponsorship ends. AmeriCorps members in this program have either college degrees or a few years of work experience and skills.
- 2. AmeriCorps State and AmeriCorps National provide funds to state and national organizations and agencies committed to using national service to address critical community needs in education, public safety, health, and the environment. Each of these organizations and agencies, in turn, uses their AmeriCorps funding to recruit, place, and supervise AmeriCorps members. AmeriCorps State/National members are over age 17 and are interested in earning money to pay for college or to pay off student loans.
- 3. AmeriCorps NCCC engages teams of members in service projects in communities across the United States. These projects typically last from six to eight weeks, and address critical needs related to natural and other disasters, infrastructure improvement, environmental stewardship and conservation, energy conservation, and urban and rural development. Members mentor youth, construct and rehabilitate low-income housing, respond to natural disasters, clean up streams, help communities develop emergency plans, and address countless other local needs. AmeriCorps NCCC members are between 18 and 24 years of age and engage in direct service.

The purpose of this chapter is to help youth science program planners understand how best to work with Ameri-Corps members to develop and sustain 4-H Science programs. Two methods for working with AmeriCorps are discussed here. The first involves working with AmeriCorps program partners, partnering with other organiza-





tions that sponsor AmeriCorps members. The sponsoring organization manages the members assigned to the 4-H Science program, and generally handles most of the administrative duties required by AmeriCorps. The 4-H Science program serves as a work site, with a specified number of positions allocated for AmeriCorps members.

The second method is to engage in direct AmeriCorps program management. A 4-H Science program staff person serves as a site supervisor for members, usually through an AmeriCorps State project (see program types above). Program management of an AmeriCorps State Program involves: recruiting members, hosting trainings, compiling monthly and annual reports for grant compliance, program promotion, performance reviews of members, managing program budget, tracking member hours, providing professional development opportunities to members, and obtaining all necessary paperwork from members to ensure safety and compliance (for more information about *Americorps* programs see *Resources* below).

Promising Practices

The promising practices for *Staffing with AmeriCorps Members* are subdivided into three categories: (a) Recruiting, Training, and Supporting AmeriCorps Members; (b) Working with AmeriCorps Program Partners; and (c) *Direct AmeriCorps Program Management*.

Recruiting, Training, and Supporting AmeriCorps Members

- 1. Search for the right fit. Understand and recruit based on program needs and priorities. If specialized skills are needed to support the program, look for someone with those skills. Alternately, look for someone with the capacity and interest to learn the required skills, and commit to helping the member develop those skills.
 - Look for people who already have a relationship with 4-H, such as former 4-H members, 4-H parents, stakeholders, program partners, advisory board members and so forth.
 - Retiree associations may be a good source for AmeriCorps VISTA members.
 - Target local colleges or institutions, in particular science-related programs. These are hot spots for young professionals who need to build their resumes. They are often willing to donate a year or two of service for the experience they will gain.
 - Post ads in local or even national venues (e.g., newspapers, trade magazines, college campuses, career services, youth groups, faith-based groups, rotary clubs, etc.).
- 2. Use AmeriCorps as an opportunity to grow your own staff. Utilize AmeriCorps positions as a way to grow permanent part- or full-time staff. This change in perspective from someone who is "only" serving for a year to someone who could become permanent staff increases how much the 4-H agent or educator is willing to invest in professional development, which ultimately benefits the youth. Also think about long-term progressions, perhaps a teen staff member or volunteer would become an AmeriCorps member, and then go on to become a permanent staff person.
 - Invest time and resources to provide quality professional development opportunities (see also <u>Training Others to Deliver High Quality Science Programming</u>).
 - Offer pre-service training before the service term begins. This provides AmeriCorps members with a general





understanding of AmeriCorps programming, as well as specific training on the service they will be performing during the course of the service year.

- *Include team building activities in trainings.* This is the first job for many AmeriCorps members, so they are usually overwhelmed. Members usually do not know each other, so it is important to build a team during that first training.
- *3. Provide monthly check-ins.* About a month into the service term provide a structured reflection time for the AmeriCorps members.
 - Ask for their insights and early impressions of what is working and where they identify areas for growth and development.
 - Discuss program quality observations and evaluations with team members to provide feedback on what they are doing well and where there are opportunities for growth.
- 4. Set individual program goals for the AmeriCorps members. Setting goals that each member must reach to earn his/her education award helps them learn self-sufficiency and also helps to meet the overall program deliverables.
- 5. *Promote partnerships.* Encourage AmeriCorps members to partner with various groups and organizations. This will increase the opportunities available to them and increase program visibility.
- 6. Capitalize on the newness. New members have a fresh perspective and are often doing and learning new things at a rapid rate, making them perfect models for the youth they are working with.
 - Encourage AmeriCorps members to be open with the youth they serve about their own feelings as they are exposed to new things that may be outside their comfort zones.
 - Ensure that AmeriCorps members have an opportunity to try things before they lead them and that they know it is okay to make mistakes, provided youth are safe.
- 7. Terminate the AmeriCorp member if not a good fit for the program. Do not be afraid to let someone go who is not working out. Ultimately the 4-H Science program participants' experiences are the primary method of evaluating the AmeriCorps members. Ongoing communication with the AmeriCorps program leaders is beneficial if there are performance challenges with any of the members. The leader will be much more likely to support termination decisions if she/he is kept up-to-date on any issues or concerns.

Working with AmeriCorps Program Partners

- 1. Find a compatible partner. Not all AmeriCorps programs are the same. Be sure to engage a partner compatible with and excited about 4-H Science. The AmeriCorps program should support and enhance the 4-H Science program and the AmeriCorps member. Some potential program partners may be easier to work with than others or may have needed resources they bring to the table from other partners.
- 2. Develop a relationship with the partner's AmeriCorps supervisor. The AmeriCorps supervisor is critical for the success of the AmeriCorps members, and ultimately the 4-H Science program the members

support. Program leaders should feel comfortable committing to a relationship with that person before a new AmeriCorps member is brought on board.

Direct AmeriCorps Program Management

- 1. Allow the program site supervisors to select the AmeriCorps members. Allowing site supervisors to recruit, interview, and recommend AmeriCorps members establishes a sense of accountability for that member, compatibility with the site, and fosters a positive working relationship. Supervisor involvement can increase success rates (e.g., completing terms of service) of AmeriCorps members.
- 2. Host trainings for site supervisors. All supervisors who monitor AmeriCorps members should go through a training to give them an understanding of what tasks their members can perform, as well as how to best supervise the members.
- 3. Station AmeriCorps members in various locations for multisite programs. This will help increase program impact. Create a sense of "team" among members. They will be able to rely on each other if needs arise, even if they are situated across the state.

Case Studies

Arnett - AmeriCorps Program Partners Place Members in Local 4-H Programs. Adventure Central currently has multiple AmeriCorps positions, all managed by other organizations or institutions. Adventure Central serves as the work site for these AmeriCorps members, and they function as group leaders, facilitating activities for youth. There are currently three AmeriCorps positions through Notre Dame Mission Volunteers AmeriCorps (11 month term) and one through the University of Dayton (semester term). Adventure Central has partnered with Ohio Campus Compact and the University of Dayton as well as the Ohio Community Computing Network to have AmeriCorps VISTA members (12 month term) support our program and develop community capacity.

A strong staff development process ensures AmeriCorps members understand the program's culture and expectations and that they gain needed skills for their own professional development. AmeriCorps members develop weekly lesson plans that are reviewed by 4-H professionals prior to implementation. The cyclical nature of staffing with AmeriCorps members requires the program to stay focused on key principles and philosophies and to be intentional about the culture and expectations for staff and youth in the program.

Adventure Central utilizes AmeriCorps members because of the benefits to the members and to the organization. AmeriCorps offers significant benefits (living allowance and education award) to its members beyond what Adventure Central could afford. Adventure Central's financial investment is a fraction of what would be spent on regularly salaried employees. Another benefit to working with an AmeriCorps program partner is that they handle the operational/administrative aspects (human resources and fiscal management) of the program. –Nate Arnett, The Ohio State University

Mullens – AmeriCorps Members Staff Statewide Environmental Program. The America's WETLAND Conservation Corps (AWCC) AmeriCorps program is the result of a partnership of America's Wetland Campaign, Ameri-Corps, and the LSU AgCenter/4-H. The AWCC is an AmeriCorps program designed to help raise public awareness about the critical importance of upland and coastal wetlands. AWCC AmeriCorps members work with the YWP





to organize local residents as volunteers to participate in wetland restoration and to conduct wetland outreach education programs.

The AWCC AmeriCorps members build community pride and environmental awareness through volunteerism and education. They also support collaborative efforts to organize and engage participants in a variety of activities with the message of responsible stewardship and a call for action to save coastal Louisiana. Exciting hands-on volunteer programs also reach, involve, and educate audiences beyond Louisiana through the work of a diverse group of members who not only take their experience with them when they leave Louisiana, but also leave a physical, virtual, and emotional handprint on the state.

Over the past four years, the program has employed 80 AmeriCorps members (in 11-month terms) at various locations across the state. The YWP provides funds to the members for travel, for supplies related to wetland service projects, and for wetland-related training. Staffing the program with AmeriCorps members allows the program to make a huge impact and get more exposure across the state. **–Ashley Mullens, Louisiana State University**

Resources

AmeriCorps Program – to learn more about the AmeriCorps program, current grantees (potential partners), or to apply, visit <u>www.americorps.gov</u>.

Staffing with Teenagers and Teens as Cross-Age Teachers

Introduction

Teenage volunteers are often underutilized in youth development programs. Successful 4-H Science programs will include youth partners in all stages of program development, implementation and evaluation using the *Youth as Partners* model (see *Resources* below).

Organizations with limited staff or adult volunteers can expand their outreach to youth in afterschool, summer, and other programs by recruiting, training, and supporting teenage volunteers as cross-age teachers in these settings. There are many other benefits to including teens in program development and delivery, including:

- Teens connect better with younger youth.
- Teens bring fresh ideas to the program.
- Teens provide honest feedback (often better than adult staff).
- As role models, teens provide younger youth something to aspire to, and help maintain their involvement.
- Teens are often proficient in technology skills.
- Teens are often current with trends.
- Teens are often able to recruit additional teens.

The teens as volunteer teachers model of program delivery can provide a powerful service-oriented, communitybased learning experience for teenagers, while benefitting those they teach. In addition, this experience may serve as an entry point for older youth to find and connect with 4-H. If the teens are new to 4-H, it is important to involve them in other 4-H activities and events while maintaining involvement through their current teaching role. Teens also benefit by learning important skills and abilities that will prepare them for the future.

It is important to remember that utilizing teens as staff or facilitators requires a substantial commitment to the teens, similar to that required to bring in new adult staff members or volunteers. Program leaders or mentors, however must be ready and willing to respond to the unique needs of the teens in a caring and supportive manner. The purpose of this chapter is to help those engaged in delivering youth science programs locate, recruit, and sustain teens interested in working with 4-H Science programs.





Promising Practices

The promising practices for *Staffing with Teenagers and Teens as Cross-Age Teachers* are subdivided into four categories: (a) Program Planning and Evaluation; (b) Recruitment, (c) Training, and (d) Resources and Support.

Program Planning and Evaluation

- 1. Read the chapter <u>4-H Science Program Design 4-H Science Checklist</u>. This chapter provides fundamental program planning and evaluation information required for successful 4-H Science programs. The information contained here is specific to planning programs that utilize teens as staff or volunteers.
- 2. Offer authentic, meaningful teaching and/or leadership roles. Look for ways to include teens in either formal or informal roles. Providing leadership roles to teens can encourage continued 4-H involvement. Remember to offer them a variety of roles; not all teens will want to teach.
- 3. Make their role special. Teens want to stand out, so give them special roles, titles, and positions. Examples include:
 - Unique name badges, lanyards, "uniforms" (perhaps a t-shirt with "STAFF" printed on the back, or in a different color from program participants); and
 - Positions that include graduated levels of responsibility (e.g., Counselor in Training/Counselor; Junior Staff/ Senior Staff, etc.) or special titles such as 4-H Science Ambassador.
- 4. Provide meaningful recognition. Recognition is important to sustaining teen involvement. Think beyond big celebration events by looking for ways to provide recognition that is meaningful to the teens. If in doubt, ask program teens how they want to be recognized. Examples include:
 - Ask teens to model exemplary teaching at trainings.
 - Provide teens with opportunities to co-present at a conference (some conferences encourage teen involvement).
 - Send a press release recognizing teen efforts and accomplishments to local media outlets.
 - See also <u>Recognizing Youth and Showcasing Programmatic Efforts</u>.
- 5. Provide incentives to teens for their time and dedication. Teens are busy and have lots of demands on their time, including other job opportunities. Make it worthwhile for them to serve as staff or teachers by providing incentives. While an hourly wage is certainly a good incentive, there are other incentives that may appeal to teens. The following examples may be tied to fulfilling some specified commitment, such as number of engagement hours, program completion, and so forth:
 - Educational stipends,
 - Life Skill Incentives (horseback riding lessons, digital camera, photography course),
 - Overnight retreats,

- Registration fees to a teen leadership conference (if they serve on the planning committee or co-present).
- 6. Partner with other agencies or organizations that provide youth incentives. Examples include:
 - AmeriCorps if age 17 or older (see also *Staffing with AmeriCorps Members*),
 - Youth jobs programs that provide wages to program participants (check local Workforce Investment Boards WIBs), or
 - Schools or other organizations that require youth to contribute volunteer service hours.
- 7. Use flexible scheduling practices. Teens are often engaged in multiple projects or activities. Allow flexibility in their schedules. The use of alternates to fill in staffing gaps may be helpful. Alternates are teens trained to teach a program who may not be available for regular participation, but can fill in as needed.
- 8. Extend service-learning beyond one program. With a little encouragement, teens will want to continue their efforts.
- 9. Evaluate teen program performance. Teens need structure and clear expectations. Evaluations provide both and give the teens much needed feedback. Performance evaluations also frame the experience like a job, creating motivation to meet the challenge. Develop rubrics for teaching and standards of teen involvement, and ensure the teens understand them and the performance evaluation process. Consider including self-reflection and peer to peer evaluations as well.

Recruitment

- 1. Recruit teens from a variety of sources. Consider the following:
 - Market needs to schools and teen programs with volunteer or service-learning requirements.
 - Tap into vocational or career track programs to provide field placements for those teens.
 - Contact high school science, media, and ecology clubs. Partner with the lead teacher/advisor in these programs to facilitate recruitment efforts.
 - Recruit from collaborating afterschool/summer program providers and their teen advisors.
 - Look for teens with an interest in facilitating program delivery to their feeder elementary or junior high/ middle schools (if nearby). Teens take pride in going back to their former schools in non-student roles, and working with feeder schools may reduce transportation and other logistical difficulties.
 - Perhaps the easiest (and most overlooked) source for recruiting teen partners is to simply ask current teen staffers and volunteers!
- 2. Assess teens interested in becoming program partners. Ensure a good fit before engaging the teens. For example, estimate the time demands of the position, and compare that to how much time the teen can realistically commit. Also ascertain their degree of subject matter interest as well as teaching readiness. Extensive content knowledge need not be a prerequisite.
- 3. Emphasize the employment process. Treat potential teen partners as job seekers for a paid position, regard-





less of whether financial incentives are involved. This serves to increase the pool of viable applicants, and navigating the process provides much-needed life skills training to youth.

- Develop a detailed position description. Include the time commitment required as well as specific task details. Also be sure to include (and discuss) the benefits of participating. Teens should know what to expect for the time they are devoting. Inform them of tangible (e.g., money, prizes, etc.) and intangible awards (e.g., skills and abilities, future life success).
- Require completion of a written "job application" and a personal interview. This is a good pre-screening tool (teens who are not really interested will opt out), and helps the teens practice job application and interview-ing skills. Consider hosting a pre-application workshop to help teens feel comfortable with the process.
- Implement a teen "employment" contract. Ask teens (and adult partners) involved in the program to complete a contract stating that after successfully completing the training, they will teach XY number of youth with XY number of hours of content. It should include any incentives the teen will receive. This may be a good time to discuss with teens any personal goals they hope to reach, and what kind of support they require.

Training

- 1. Read the chapter <u>Training Others to Deliver High Quality Science Programming</u>. This chapter provides an in-depth discussion of promising practices for training staff and volunteers. The promising practices contained here are geared specifically to training teen staff or volunteers to deliver 4-H Science programs.
- 2. Provide quality training for teens and their adult partners. Ensure that enough time is planned for training teens and the adults who will be supporting them. Provide enough training to ensure the product or outcome desired, but not so much that it overwhelms the teens. Plan trainings according to the developmental state of the teens. Remember that teens will respond better when they are part of developing the plan and implementing the solution.
 - Require adult partners to attend the trainings. No matter how knowledgeable adults are in the subject matter, they must understand how to implement the specific program, as well as how to work with teen partners.
 - Allow time for teens to plan program delivery. Teach not only the content piece but also the "how" to find groups to teach.
 - Include teambuilding initiatives for teens and their adult partners.
 - Model the skills and behaviors you want participants to emulate. Always keep in mind that people model what they see; teens are certainly no exception.
 - Use experienced teens as co-trainers. This is a form of recognition, and helps "keep it real" for the trainees. Have a model facilitator session using the experienced teens.
- 3. Create opportunities to practice! Practice takes extra time but is a vital component of a successful teen teaching experience. Make suggestions and offer resources that strengthen what and how they are teaching. If there are multiple teens teaching multiple workshops, have them present their lessons to each other, and guide a constructive discussion after each presentation. This creates a learning community as well as a teach-

ing support system for them to access before, during, and after their teaching experience.

- 4. Group youth into teaching teams. Assigning teens into teaching teams creates greater comfort for them as they are planning and implementing the lessons. It also builds a sense of accountability to each other. Allow teens to work with whomever they choose.
 - Create teams with 2-4 teens and 1 adult coach/partner.
 - Pair a more experienced teen teacher with an inexperienced teen. The experienced teen can mentor the new teen. It is the experienced teen's responsibility to move the new teen through the process (counselor-in-training concept).
- 5. Ask youth to visualize the teaching process. Help them think through the lesson, including what they might need and how they will present the activity. Ask teens to brainstorm about the kinds of unexpected occurrences they might encounter and how they would handle them. Problem-solving ahead of time increases the teens' ability to deal with problems when they occur, but try to avoid simply presenting them with solutions.

Resources and Support

- 1. Provide research-based curricula and materials. Materials should be teen-friendly, easy to follow, and structured in a way that is suitable to teens working in pairs or teams to present in a variety of settings (for more about appropriate curricula see also <u>Inquiry Based Learning Approaches</u>).
- 2. Supportive adult partners are a critical factor in great teen teaching. They should understand the goals and philosophy of the program. A supportive adult should be present when a teen is teaching, to provide moral support and to assist should something unexpected happen. Look for adults who:
 - Have a strong rapport with teens,
 - Can gently pose ideas to consider,
 - Are good listeners, and
 - Enjoy teenagers.
- *3. Ensure that adults working with teens are trained and prepared.* Determine readiness of adults for this role. Adult partners must be willing to:
 - Commit fully to understanding and practicing the Youth as Partners model.
 - Understand expectations.
 - Know the curriculum.
 - Attend and participate in trainings (do not let them off the hook!).
 - Assist with obtaining supplies and materials, room preparation, and other logistics.
 - Mentor/coach teens.





- Assist with maintaining the learning environment (e.g., unruly youth, logistical difficulties, etc.).
- Help facilitate continuous development of the teens' skills.
- 4. Assist teens in reflecting on their teaching experience. When teens reflect on their teaching responsibility, they identify their strengths as teachers and areas upon which they need to improve. This is an important step, so explore methods to encourage the process, such as face-to-face meetings, phone conversations, journaling (be sure to include a method to provide feedback), and so forth.

Case Studies

Arnett – Science-Based Teen Employment Program Facilitates Life Skill Development. The Adventure Central summer Job Experience and Training (JET) work-based learning program engages teens in parks-related careers to increase skills and deliver a service to the public. Each summer 20-25 teens are placed in a variety of roles (e.g., park maintenance, day camp counselor, information technology, nutrition/food service, administrative, public education, recreation education, etc.) and mentored by an adult supervisor over the eight-week program. Teen day camp counselors serve as program facilitators for younger youth and deliver a science and nature curriculum. A variation of the program has been offered during the school year targeted at early teens to place them in a position of responsibility, typically assisting with one of the younger groups. Teen counselors are also utilized for the Adventure Central overnight camp experience. Teens participate in three to four planning and training sessions throughout the year and then implement the three-day, two-night camp with staff support. One or two teens serve as the camp director and facilitate the camp experience while supporting their peers and holding them accountable for program performance. As part of the science fair, older youth help to critique and support younger youth as they work on their oral presentations. These older youth have the benefit of previous coaching through the program and are excited to share their knowledge. Younger youth appreciate the older teens' interest and feedback. Older youth also assist with judging for the science fair. **–Nate Arnett, The Ohio State University**

Bird – Teens in Authentic Leadership Roles Expand Reach of 4-H Science. Engaging teens in the delivery of 4-H Science programs is an excellent way to enhance the learning experience for younger youth, develop teens' budding skills, and bring new, older youth to the 4-H experience. In Sacramento, teens teach weekly 4-H Youth Experience in Science (YES) Program lessons to children in grades K-3 in afterschool programs. Teens also serve as both program planners and as staff for the 4-H On the Wild Side environmental education camp that takes place two weekends in late May/early June for 4th-6th grade youth. In both instances, teens work in teams to plan and deliver science lessons from pre-determined curricula. Teens are recruited through local high schools, service clubs, and from afterschool programs with the YES Program. Often teens who volunteer for the programs have service requirements they need to complete for school, and they find 4-H programs via the web or through word of mouth.

Teens are treated as valuable resources, know what is expected, and are given the tools and resources (including adult coaching) to do their jobs. Each program has an application process and training: YES requires 10 hours of training (a Friday evening and most of the day on a Saturday); On the Wild Side requires four evening meetings, a six-hour training, and a weekend retreat. In both programs, teenagers engage in authentic leadership and teaching roles. They are completely responsible for planning, organizing, and delivering the program. –**Marianne Bird, University of California**





Francis – Teen Teams and Adult Coaches Deliver Community STEM Experiences. The TRY STEM: Teens Reaching Youth in Science, Technology, Engineering and Math program is designed to provide teens in grades 8-12 with formal leadership and teaching opportunities. 4-H teens deliver STEM experiences during out-of-school time to younger audiences and the community at large. A 4-H TRY team consists of two to four teens, working in partnership with an adult coach. TRY teams, both members and coaches, complete a variety of local, regional, and statewide trainings to prepare them to successfully facilitate the project for younger youth. A TRY training is divided into two parts: (a) TRY Core Training – participants learn how to work with and teach younger youth, while working as a team with fellow members, and (b) Curriculum Training – participants complete in-depth training in a specific curriculum or project area. Kits to support the curriculum are available for check-out.

As part of receiving the STEM training, teens complete a contract stating that they will teach at least 15 youth for a minimum of six hours of STEM content (to the same group of youth). Teams are challenged to earn a bronze, silver, or gold level, with corresponding awards based upon the number of youth taught. Teens have provided STEM experiences during afterschool programs, 4-H Achievement Nights, Family Science Nights, and special events (e.g., Science Day, Saturday Robotics, etc.). One county documented their STEM efforts in a film produced by the teens. The film was awarded 1st Place 4-H Science Film at the National Association of Extension 4-H Agents Conference. **–Dave Francis, Utah State University**

Resources

Creating Youth-Adult Partnerships: Training Curricula for Youth, Adults and Youth-Adult Teams – leads youth and adults new to group facilitation and to youth-adult partnerships through a 6-8 hour training that builds their capacity to work together in true collaboration. The 156-page step-by-step curriculum includes detailed scripts, activities, and evaluation materials. Available at <u>http://www.theinnovationcenter.org/store/87</u>.

Engaging Older Youth: Program and City-Level Strategies to Support Sustained Participation in Out-of-School Time – includes information on keeping youth engaged over time, developmental differences between middle school and high school programs, city-level supports to promote and sustain participation, and key findings and implications. Available at <u>http://www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAr-easofFocus/Out-Of-SchoolLearning/Pages/engaging-older-youth-city-level-strategies-support-sustained-participation-out-of-school-time.aspx.</u>

Teens as Volunteer Leaders: Recruiting and Training Teens to Work with Younger Youth in After-School Programs – includes information on the elements of teens as volunteer leaders, teen recruitment, mentor and afterschool program recruitment, project orientation, training, recognizing program participants, and promoting 4-H afterschool. One of several 4-H Afterschool Resource Guides available at <u>http://www.scribd.com/doc/102794559/</u> <u>As-TeenVolunteers-1</u>.

Recognizing Youth and Showcasing Programmatic Efforts

Introduction

Youth recognition and program showcases are vital parts of any programming cycle. Recognition is a basic youth need, and provides them with motivation to not only complete projects, but to complete them in an exemplary manner. It is important for adults who work with 4-H members to provide appropriate recognition to all participants. The *National 4-H Recognition Model* includes five types of recognition (see *Resources* below).

- Recognition of 4-H members for participation in educational experiences acknowledges involvement as a first step in building a positive self concept.
- Recognition of progress toward personal goals enables youth to gain experience in goal-setting and realistic self-assessment.
- Recognition of the achievement of generally recognized standards of excellence gives youth an external, pre-determined target for their learning experiences.
- Recognition through peer competition is a strong motivation for some but not all young people. It is not appropriate for youth under age eight.
- Recognition for cooperation helps youth learn and work cooperatively, preparing them for living in today's inter-dependent, global society.

Program showcases provide youth a wonderful venue to share what they have learned with others, another form of recognition, and a great incentive to do good work. Showcasing programmatic efforts is also an unparalleled opportunity to promote and market your 4-H Science programs to key stakeholders; program funders and sponsors; local, county and state officials; parents; and the community at large.

The purpose of this chapter is to help program planners understand the importance of providing youth appropriate, meaningful recognition (beyond the obligatory certificate), as well as the value of showcasing programmatic efforts. The following promising practices also contain practical information and ideas for providing youth incentives and recognition and hosting a program showcase.

Promising Practices

The promising practices for *Recognizing Youth* and *Showcasing Programmatic Efforts* are subdivided into two categories: (a) Recognition, and (b) Program Showcases.

Build recognition and program showcase opportunities into initial program design. Instead of viewing a recognition activity as an individual project, it is imperative to include it in program planning and implementation.





Recognition

- 1. *Recognize successes within a reasonable timeframe.* For maximum effect, do not delay incentives and recognition any longer than necessary.
 - Special events or activities may be included as part of an ongoing program (before the program ends), and may also be used as opportunities for additional enrichment. For example, ropes courses and rock climbing can function as incentives *and* offer teambuilding opportunities.
 - Assess the impact of a program shortly after the program ends to show those involved the effects of their contribution(s).
 - For youth volunteers, recognition should not be just an end-of-program activity or program showcase. A small recognition should be immediate and informal to provide some needed feedback to youth volunteers on their performance. Many programs have annual or bi-annual volunteer awards ceremonies, which make for a nicer event, but this may delay recognition.
- 2. Offer meaningful opportunities to recognize youth for their accomplishments. Sometimes we get "certificate happy" and rely too much on them to provide kudos. Certificates are not always fitting as an expression of gratitude for a teen's commitment to a project. If in doubt, ask youth for ideas. Consider trying the following:
 - Scholarships/sponsorships (for conferences, state and national events or activities);
 - Stipends or other monetary awards;
 - Giving recognition in front of their peers (see Nolen in Case Studies below);
 - Meals (pizza parties), awards breakfasts, or other food-related treats (ice cream socials);
 - Hand-written thank-you notes;
 - Newspaper, newsletter, website acknowledgments of their successes and contributions;
 - Opportunities to present at conferences, or to be model presenters for training workshops;
 - Showcasing youth in marketing materials and PSAs; and
 - Retreats, annual recognition events and/or trips (e.g., science centers, museums, businesses, etc. especially if include an overnight stay) can be used as capstone events tied to the educational objectives of the program (see *Ripberger* in *Case Studies* below).
- 3. Recognize the value of contests, skillathons, design challenges, etc. as incentives to motivate youth. Include opportunities for age-appropriate friendly competition in the program design. Youth are naturally competitive, and these kinds of activities will motive youth to complete projects, stimulate learning, and provide an opportunity to recognize them for their accomplishments (see *Nolen* in *Case Studies* below).
- 4. Provide authentic leadership opportunities. Recognizing a young person can be as simple as asking them to show others what they have learned from their past experience with 4-H Science projects. Offer junior leader appointments to youth who completed the program in the prior year. They can oversee resources,





demonstrate experiments, and share what they did last year in the program. Seek their input in the program planning stage.

- 5. Create lasting mementos of the experience. Youth enjoy tangible remembrances, especially photographs.
 - Plan programs to include items that can be sent home at the end of the program (projects, journals, certificates, project books, etc.).
 - Take and share lots of photos and video (e.g., websites, newspapers, newsletters, etc.). Provide youth with copies on DVD or other format at program closing.
- 6. Include individual learning portfolios in program planning. Learning portfolios include a compilation of works created by the youth, such as videos, stories, projects, web-based materials, and so forth. Portfolios can be showcased at county and state fairs or other local community events.

Program Showcase

- 1. Create opportunities for youth to showcase program efforts. Rather than trying to force a fit with other 4-H events, the closing showcases are tied to the program and its timing, location, and community members (see *Ripberger* in *Case Studies* below).
 - Connect to larger community events such as resource fairs, community days, and so forth.
 - Ask to be included in appropriate partner organization events.
 - Arrange for youth to make presentations at stakeholder, school board, and even city/municipals meetings.
- 2. Combine recognition events with the program showcase to celebrate youth achievement <u>and</u> promote the program. Go the extra step to make sure youth are recognized for their commitment and to showcase program efforts.
 - Since a program showcase generally has a larger, more diverse audience than a recognition event alone, youth will feel an even greater sense of pride in the recognition they receive.
 - Combining recognition with a program showcase provides a better picture of youth and program accomplishments for key stakeholders. Consider asking stakeholders to hand out recognition items.
- 3. Remember that a program showcase is an important part of the 4-H Science marketing plan. While this event is an important way to provide recognition to youth, it is invaluable for promoting the program itself (and 4-H Science in general) to the community, including current and potential funders, partners, and so forth.
 - Include refreshments, generally at the beginning of the event.
 - Send invitations via email, regular mail, and with youth.
 - Coordinate with program partners to plan and implement the event.
 - Partner with community venues to host the event, instead of hosting it in primarily 4-H facilities (e.g., school auditoriums, movie theaters, partner organization, etc.).

- Invite parents and other family members. Even if parents cannot attend, they should receive information
 about the event and the youth should have ribbons, certificates, project books, portfolios, or other kind of
 end-of-program packet to share with them later. This recognition will give the parent and youth an opportunity to talk about what they did in the program.
- 4. Include program partners and key stakeholders. Show key players what youth are contributing to or accomplishing in the program.
 - Local funders are happy to attend culminating events. They feel good about their impact on the youth, and it sets the stage for future funding. Attendance at an event is much more memorable than reading a final report!
 - Municipal and county (even state) officials also welcome the opportunity, and often bring media coverage with them. Invite them to speak at the event if possible.

Case Studies

Nolen – Multiple Methods to Motivate and Recognize Youth. A chance to be recognized is a huge motivator, especially when opportunities to win are fun and challenging. A chance to participate with peers on a team promotes cooperation and teambuilding, as well as a sense of achievement. The way opportunities are structured for youth to excel and be recognized has important implications for positive youth development. Evaluations and soliciting feedback from site partners and youth participants help increase understanding about what works and how program design can be improved. The 4-H Science Afterschool Program in Houston uses multiple methods to motivate and recognize youth.

Contests and Skillathons. The 4-H Aerospace program utilizes skillathons to recognize youth. Staff serve as judges using checklists to evaluate each team based on a set criteria for teamwork, problem solving, and conducting successful flight tests. Teams are ranked one to five, with ribbons, certificates, and prizes awarded related to the theme of the contest. Youth also receive a resource book with the activities completed and new activities to try at home. The resource book sent home with youth with a "big" 4-H Emblem on the cover promotes 4-H and boosts enrollment.

Program staff and youth agree that a little competition with prizes, ribbons, and certificates awarded motivates youth and helps them feel a great sense of accomplishment. This is particularly true when working with youth who struggle with English as a second language or have difficulty achieving in the classroom, but gain confidence when they get a chance to prove what they can do. A 5th grade boy who had participated in the 4-H Aerospace Skillathon the year before, reminded program staff how important incentives are when he said out of the blue, "I won fifth place last year flying the airplanes." Later that year, this same boy explained that he could not lead the 4-H Motto and Pledge, because he could not read. The importance of that 5th place ribbon was suddenly magnified.

Recognition can jump-start conversations at home with parents about what they did in 4-H Afterschool that day. Youth recognition incentives are also a great way to promote the program. Incentives that double as educational resources can be a source of pride to the youth, expand learning, and become a family resource the youth can share with parents and siblings.





Engineering Design Challenges. Challenges are easy to organize and can be used to build teamwork (e.g., designing paper bridges, straw structures, ball and track jumps, etc.). Any teambuilding activity that involves constructing something, creative thinking, and problem solving will work. For challenges youth are awarded bonus points for first and second place, or special privileges.

Program Showcases. The 4-H Science Film contest showcases the film projects to peers, parents, and staff. Judges rank the films and award ribbons and certificates. A reception is held to celebrate youth achievements, complete with fruit parfaits.

Peer Recognition. Recognizing youth among peers during the afterschool program or an assembly with key stakeholders, school administrators, and parents promotes a sense of pride for participants and showcases the 4-H Science program. Youth will remember the recognition experience. The awards process (hearing their name called, coming forward to shake hands with the presenter, hearing the applause, and taking their place with their peers) adds meaning to the learning experience. This is how youth get the courage to believe and value intrinsic rewards. They learn that a sense of pride in the accomplishment is more valuable than any extrinsic material rewards. **–Sheryl Nolen, Texas A&M University**

Ripberger - Recognition Motivates Youth and Furthers Educational Goals. 4-H Afterschool in Trenton, New Jersey includes several 4-H Science programs – Design It! and Explore It! (NPASS2 – Center for Science Education at EDC), the Junior Master Gardener[®] program, and 4-H 4-REEL (a digital filmmaking program). These 12-week programs are delivered by 4-H staff in collaboration with afterschool providers. In each 12-week afterschool program, youth work in teams on multiple projects or toward a culminating project. Incentives, program showcases, and recognition trips are built into each of the 4-H Science programs and are recognized as critical components of program design.

For example, in 4-H 4-REEL, during recruitment of youth and as part of the initial program session, staff outline program incentives and recognition opportunities. This includes a recognition trip to New York City (NYC) for the highest scoring team from each site and cameras for each member of the highest scoring team overall (four sites are involved each year). Participants know their efforts are leading to a final video that will be screened at a closing reception and program showcase with afterschool youth, family, and key stakeholders from each of the four sites. Each team is recognized when their project is screened, and all participants receive certificates and a DVD containing the video projects. Guest judges (a mix of youth development and content-rich professionals) provide feedback to individual teams and select the highest scoring teams from each site. Rather than trying to force a fit with other 4-H events, the closing showcases are tied to the afterschool program and its timing, location, and community members. The recognition trip to NYC includes educational visits to the Sony Wonder Technology Lab, Museum of the Moving Image, and NBC Studios. The key is that recognition is built into the design of the program, occurs throughout the program in multiple ways, serves as a source of motivation, and further enriches the learning. **–Chad Ripberger, Rutgers University**

Resources

National 4-H Recognition Model – the model, including five types of recognition and suggestions for applying the model, is available at <u>http://www.national4-Hheadquarters.gov/library/4h_recmo.pdf</u>.

Marketing and Branding 4-H in Urban Communities

Introduction

Consistent marketing and branding is vital to the long-term success of 4-H Science programming. Marketing and branding "... is not about getting your target [audience] to choose you over the competition, but it is about getting your prospects to see you as the *only one* that provides a solution to their problem (L. Lake)." The problem for out-of-school time (OST) youth programs (e.g., afterschool programs, summer camps, etc.) is that they need informal science education resources. The solution is 4-H Science! 4-H Science has unparalleled expertise and resources (backed by the land grant university system) available to develop and deliver informal science programming – within the context of positive youth development (PYD).

Introducing 4-H Science into urban communities also provides a golden opportunity to shape the kinds of programming this audience will think of when they hear "4-H Youth Development." Urban residents often do not have preconceived ideas about who 4-H is, or what 4-H offers. Therefore, what people observe 4-H "doing" determines how they will think of 4-H. Intentional program design, coupled with enthusiastic marketing and branding practices allows 4-H to positively influence community perception from the start! The purpose of this chapter is to provide 4-H professionals with the information needed to effectively market and brand 4-H Science programs in urban communities.

Promising Practices

The promising practices for *Marketing and Branding 4-H in Urban Communities* are subdivided into four categories: (a) General, (b) Partnerships, (c) Program Planning, and (d) Program Marketing and Promotion.

General

- 1. Develop a written, personal 4-H marketing/branding philosophy. Take some time to reflect on the importance of promoting the 4-H brand in all 4-H Science program materials. Examine any personal fears or hesitations that may have prevented this in the past, and commit in writing to being proud of the heritage that is 4-H, and of the 21st century opportunities 4-H is embracing (see *Wagoner* in *Case Studies* below).
- 2. Be intentional when communicating about 4-H. Take advantage of every opportunity to communicate the breadth and depth of 4-H programs.
 - Create a brief summary that explains the history of 4-H, as well as future directions. Practice articulating what unique opportunities and strengths 4-H brings to the table. In particular, be sure to relate that 4-H Science is *science in the context of positive youth development* (PYD). This sets 4-H Science apart from programs that are strictly science education.
 - Use the phrase "4-H Youth Development," the 4-H mission mandates (Science, Healthy Living, Citizenship),





and the Essential Elements of 4-H (belonging, independence, mastery, generosity) in your communications.

- 3. Emphasize the connection between 4-H and the state land grant university system. Create a program name/ logo combination that intentionally connects the 4-H brand (and 4-H Emblem) to the land grant university system (e.g., 4-H – The Youth Development Program of the Land-Grant University). This will help consumers understand who is offering the program, especially important in urban areas with multiple colleges and universities, thus avoiding confusion regarding program affiliation.
- 4. "Brand" 4-H Science programs consistently. It is imperative that all 4-H Science programs (and all 4-H programs), use the 4-H Emblem at all times. Educate others about what it represents. Failure to display the 4-H Emblem out of fear of what "others" will think is detrimental to building awareness of 4-H Science.

Partnerships

- 1. Market yourself to potential (and current) partners. Make it a point to "be at the table." Attend communitywide youth development meetings, summits, boards, and so forth. Provide updates and one-pagers. Share the 4-H story with everyone.
- 2. Reach agreement with partners on 4-H signage and recognition opportunities. When working in partnerships, always co-brand materials. Negotiation and compromise are keys to success when marketing 4-H youth development programs and branding options to potential partners. Reaching an acceptable marketing and branding relationship relative to program components, evaluation strategies, and reports to stakeholders makes it easier for partners to work side-by-side while still having their individual needs met.
 - There is no question about whether the 4-H Emblem should be included on program materials, but do discuss or clarify how it should be used (see 4-H Emblem in Resources below). Also discuss inclusion of appropriate verbiage recognizing Extension and the Land Grant University in all marketing materials.
 - As part of the MOU, both parties should agree on the level of recognition each partner will receive on respective publications, signage, websites, and other media (see also <u>Create a Memorandum</u> of Understanding in the Section Introduction to Partnerships, Resource Development, Program Growth and Sustainability).
- *3. Participate in partner events.* Partner events are the perfect opportunity to support the partner while also promoting 4-H Science programs (e.g. activity stations, information booths, etc.).
 - Bring plenty of branded promotional items as giveaways, as well as branded marketing materials (see 4-H *Mall* in *Resources* below).
 - Bring a laptop computer and showcase the 4-H Science PSA Campaign (see *Program Marketing* and *Promotion* below) or an automated PowerPoint presentation about current 4-H Science program offerings.

Program Planning

Choose program topics based on the needs and interest trends of urban youth. Use program planning to create opportunities for 4-H to look relevant (for people to say "WOW, that's 4-H? I didn't know 4-H did that") by offering current, engaging programs. Some topics may be perennial favorites. Other topics may have a shorter shelf life, but are needed to attract new audiences and provide fresh content for returning program participants.




- 2. Charge program fees where appropriate. Strategic program fees are part of a marketing plan. Clientele and program partners often associate quality with fee-based programs. Understanding the local market is crucial to developing the most effective pricing structure. Use sliding scales and scholarships for those with financial need.
- 3. Include program showcase events. Culminating events, program showcases, and recognition events are excellent opportunities for community-wide promotion (see <u>Recognizing Youth and Showcasing Programmatic</u> <u>Efforts</u>).

Program Marketing and Promotion

- 1. Understand cultural beliefs. Key informants and cultural guides can help Extension staff understand the cultural beliefs of specific urban audiences. Highlighting how 4-H principles relate to a community's cultural beliefs establishes common ground to discuss how 4-H Science can meet their needs as an urban population.
- 2. Utilize 4-H marketing and promotion resources. Be familiar with the resources currently available to help effectively market/brand 4-H Science programs. These resources were developed by professionals. They include sound ideas and are of excellent quality. The following web pages contain invaluable resources.
 - <u>4-H Science Research</u>. This web page includes links to the brochures for the YEAK Report (Youth Engagement, Attitudes, and Knowledge) and the 4-H Science Implementation Study (see *Resources* below).
 - <u>4-H Promotional Toolkits</u>. Look for The 4-H Science PSA Campaign, One Million New Scientists. One Million New Ideas[™], which has excellent videos (see Resources below).
 - <u>4-H National Youth Science Day (NYSD</u>). This web page contains information about the national experiment as well as event planning resources (three-month planning timeline, customizable flyers, newspaper and web banner ads, and even an NYSD graphic for a Facebook page). There is also an event archive for 2008-2010 NYSD materials (see *Resources* below).
- 3. Develop and use high quality marketing materials that appeal to urban audiences. Collaborate with university and Extension communication offices. They will give professional polish to marketing materials. Continually feed communication offices stories, photos and videos so they can share and promote 4-H Science programs! Be sure to:
 - Reflect current and diverse 4-H Science curricular offerings (e.g., robotics, GPS/GIS, aerospace, etc.).
 - Include photographs and video of a diversity of participants, staff, and volunteers.
 - Eliminate the use of clip art and word art. Use high quality, 21st century graphic images.
 - Engage a cultural interpreter from the community to help translate materials into the relevant dialects. Do not assume a "one-size fits all" approach to any language. For example, there are variations in the Spanish language that reflect the country (or even locale) of origin. Be mindful of average literacy levels regardless of language spoken.
 - Create a 4-H Science web page within your county and/or state 4-H websites. Showcase program successes and evaluation results. Web pages should be fresh and up-to-date with current information. Avoid juvenile

animations. Photos should represent diverse audiences engaged in exciting activities.

- 4. Engage in strategic marketing. Use targeted promotional strategies. Know where to find youth of the appropriate age to fill participant slots.
 - Contact previous participants via mail or email.
 - Post flyers in kid-friendly (and age appropriate) locations.
 - Post program information in schools' electronic backpacks.
 - Send flyers to appropriate grades in schools and afterschool programs.
 - Share current program results and photos with participants *and* with youth who did not attend to let them know what they missed.
 - Partner with the municipality to include your program in recreation booklets.
 - Participate in camp fairs and directories.
 - Post electronic flyers on partner websites (e.g., nature camp flyer on home page of Nature Center).
 - Leave brochures with relevant science centers and museums.
- 5. Market program evaluation results. Tell your story to stakeholders. It is important to conduct program evaluations in order to share program successes with current and prospective volunteers, participants, funders, program partners and other supporters (see <u>4-H TRY STEM Report</u>).
- 6. Provide branded items to everyone. There are countless ways to promote 4-H Science (and 4-H). Accept the challenge to locate and/or create properly branded, meaningful, appealing items to give to everyone connected with the program. For example:
 - Program staff should wear university/4-H clothing and name tags when engaged with the public (implementing programs, attending meetings, coordinating events, etc.).
 - Facilitators (youth and adult) should wear appropriately branded clothing and name tags.
 - Partners, funders, and guest presenters appreciate receiving branded t-shirts or shirts, pens/pencils, coasters, paperweights, key chains, and so forth.
 - Youth enjoy receiving lanyards, t-shirts, hats, pins, balls, pens/pencils, plastic cups, key chains, and so forth.

Case Studies

Wagoner - Personal Marketing Philosophy. Through work in multiple urban areas, I have refined my philosophy and approach when working with program partners. Holding a personal 4-H marketing and branding philosophy equips me to be consistent in my outreach to new audiences unfamiliar with 4-H. My philosophical statement explains how I work to *educate* partners and *adapt* programs to jointly meet clientele needs.

The green and white 4-H Emblem is one of the most well-known brands in the world. It has existed for over 100 years. The 4-H Name and Emblem is a highly valued mark within our country's history, and it has a special status.





It is in a category similar to the Presidential Seal and the Olympic Emblem, with a patent and guidelines for use. Our federal partner, the United States Department of Agriculture, considers all Extension-sponsored and administered youth development programs 4-H. 4-H clubs, special interest groups, short-term programs, Cloverbud groups, and camping programs are all 4-H delivery modes. It is important we *educate* our constituents about the variety of programs the 4-H brand signifies.

As Extension professionals, we respect the 4-H brand when we educate our partners about the diversity of the 4-H Youth Development Program, and help them adapt 4-H programs to their unique situations. Each opportunity we have to clarify the broadest view of 4-H with our *partners* is a teachable moment. If we do not accept that opportunity, we miss the chance to clarify who we are, how our program is different from other youth programs, and how opportunities we provide youth, families, and communities today are real solutions to important issues in their lives. Working with partners to choose the delivery mode, determine the duration and intensity of the program, identify subject matter, outline roles for adults in the program, and develop evaluation plans allows those partners to adapt the model for their audience and their educational setting. Regardless of how the program looks, where it is held, or who the participants are, it is still 4-H and should be identified as such.

When all our youth development programs carry the 4-H brand, clients recognize our successful history, see the diversity and flexibility of our programs, and realize today's 4-H youth development programs address their issues in ways other programs cannot. They see 4-H Youth Development as a "one of a kind" program that meets their needs. –Steve Wagoner, University of Illinois

Resources

4-H Name and Emblem – a fact sheet on the proper use of the 4-H Name and Emblem. Available at <u>http://www.</u> <u>national4-hheadquarters.gov/library/4-Hguidelines-v4-26-04.pdf</u>.

4-H National Youth Science Day – site includes a three-month planning timeline, customizable flyers, newspaper and web banner ads, and even an NYSD graphic for your Facebook page. Get started with the 4-H National Youth Science Day event planning timeline, and a brief overview of how to make the most of the materials in the kit. Available at <u>http://www.4-h.org/4-h-national-youth-science-day/nysdhome.aspx</u>.

4-H Promotional Toolkit – an online set of resources including the 4-H Science PSA Campaign *One Million New Scientists. One Million New Ideas*[™]. Available at <u>http://www.4-h.org/resource-library/promotional-toolkits/</u>.

4-H Science YEAK and Implementation Study Brochures – Available at the 4-H Science Research page <u>http://www.4-h.org/about/youth-development-research/science-program-research/</u>.

Contributor Bios



Nate Arnett is the Director/Extension Educator for Adventure Central, a youth education program and center in Dayton, Ohio serving urban youth and their families. For over 10 years he has given leadership to this unique and nationally recognized model program and partnership. Nate is actively involved with statewide efforts in the area of 4-H teen workforce preparation and has been a co-leader of this initiative for over two years. His specialization is in the area of work-based learning. Nate recently served as part of a national 4-H think tank charged with helping develop programs and strategies to reconnect youth and nature. Nate also spent two years as a Regional 4-H Youth Specialist with the University of Missouri Extension prior to coming to Adventure Central. Nate has a B.S. from Phillips University in Environmental Science and a M.S. from the University of Missouri-Columbia in Parks, Recreation and Tourism. **The Ohio State University**, *narnett@metroparks.org*.



Marianne Bird oversees the 4-H Youth Development Program in Sacramento, California, and works in partnership with volunteers and community organizations to diversify and enhance educational opportunities for youth. Collaborations with Sacramento START and other afterschool program providers paved the way for new science programs: the 4-H Youth Experiences in Science Project, 4-H Water Wizards Project, and 4-H On the Wild Side environmental education program, all delivered to urban audiences. Marianne utilizes the talents and energy of teenagers as teachers in these endeavors. Her passion for working with young people grew from early experiences at summer camp, and she now chairs the California 4-H Camping Advisory Committee. Her research focuses on measuring program impact – including the California 4-H Camp Study – and examining community-wide youth initiatives. Marianne is a 4-H Advisor for the University of California Cooperative Extension. She has a B.S. in Human Development and M.S. in Community Development, both from UC Davis. **University of California**, *mbird@ucdavis.edu*.





Richard P. Enfield has been the 4-H Youth Development Advisor with UC Cooperative Extension, San Luis Obispo (SLO) County since 1980, as well as County Director since 2005. He has concentrated on the development and delivery of hands-on science programs for non-formal educational settings since the mid-1980s. He is the initiator and co-developer of an experiential and inquiry-based youth-adult science program called 4-H SLO Scientists. Since 1997, he has also focused his research and educational efforts on the complimentary concepts of resiliency and the developmental asset framework. He has presented workshops, seminars and "Training of Trainers" on these topics to adults and youth throughout California and the United States, including numerous workshops to help 4-H leaders and others understand and put into practice the principles of inquiry and experiential education. In addition, he has authored articles and monographs on these topics, thereby reaching a wider and diverse audience with useful information. **University of California**, *rpenfield@ucdavis.edu*.

Jackie Davis-Manigaulte, Ed.D., is a Senior Extension Associate and Family & Youth Development Program Leader with Cornell University Cooperative Extension in New York City. Jackie has extensive experience in the leadership, development and implementation of informal educational programs for youth and adult audiences. She has worked closely with colleagues and community leaders throughout New York City and State, and served on a number of national committees focused on the development of programs for youth and adults on topics related to positive youth development, nutrition, environmental issues, parenting education, child development, hydroponics, gardening, and youth entrepreneurship. She has a Bachelor's Degree in Human Development and Family Studies from Cornell University/ College of Human Ecology, a Master's Degree in Home Economics from New York University/ School of Education; and a Doctorate in Adult Education from Columbia University/ Teacher's College. **Cornell University**, *jad23@cornell.edu*.



Beth Rasa Edwards, University of Missouri Extension, is a 4-H Specialist in Jackson County whose primary responsibility is in 4-H Afterschool program efforts. Over the last six years she has co-facilitated a \$348,000 annual grant/contract for 4-H Afterschool programs, providing funding for seven full-time staff with over 600 4-H Afterschool club members. 4-H science programs include Robotics, Sports Fishing, GIS/GPS, Gardening, and Food and Nutrition. Beth created and co-coordinated the Power UP! Your Afterschool Professional Development Institute. She works with local afterschool program partners to implement 4-H Afterschool research-based curricula. Beth has a double B.S. in Child and Family Studies/Psychology from Northwest Missouri State University and a Master's degree in Social Work from the University of Kansas. **University of Missouri**, *rasab@missouri.edu*.



Dave Francis has worked for Utah State University Extension 4-H since 2001. He is currently an Extension Associate Professor with responsibilities for 4-H Science in the Utah State 4-H Office. Responsibilities include working with Extension partner Thanksgiving Point, a museum complex that includes a working farm, dinosaur museum, and botanical gardens. He works with a variety of 4-H programs to promote STEM through robotics, afterschool programs, science camps, 4-H TRY (Teens Reaching Youth), and 4-H Aggie Adventures for kids. He has a B.S. in Environmental Studies, (environmental education emphasis) and a M.S. in Agriculture Systems, Technology and Education (Extension Education emphasis). **Utah State University**, *dave.francis@usu.edu*.



Janet Martin, Urban 4-H Specialist in Iowa City has 30 years of experience in the Iowa 4-H program. She leads the science, technology, and engineering afterschool and summer 4-H programs in east central Iowa. Curriculum resources from the Iowa 4-H SET Initiative and cooperation with education and business partners in the "out of school" committee of the Corridor STEM Initiative provide the resources and expertise for 4-H youth programming. Janet's 4-H science programs include Summer 4-H on Wheels, summer robotics through GEAR-TECH-21, Engineering is Elementary© summer and afterschool programs, and afterschool science in cooperation with the 21st Century Community Learning Centers in the Iowa City Community School District. Cooperation with partners in the technology corridor in eastern Iowa has been vital to the expansion of 4-H urban science programs in Linn and Johnson Counties. Janet has a degree in Elementary Education from Iowa State University and a master's degree in Educational Psychology from the University of Iowa. **Iowa State University**, *jmmartin@iastate.edu*.



Leon Moon is the 4-H Youth Development Specialist for Urban Afterschool programs in Jackson County, Missouri. He has served as the director of afterschool programs for the past 11 years, and was instrumental in acquiring over \$6 million in funding for county 4-H programs. The afterschool programs have concentrated on career development and academic achievement for underrepresented populations in the Kansas City, Missouri area. Programs featuring cross-age education, dropout prevention and high school graduation have received national recognition. 4-H Science programs have covered most of the SET project areas with a special focus on Robotics, GPS/GIS and Sport Fishing. Leon began his 4-H career in 1965 in Morgan County, Ohio, and has served as Executive Director for Missouri and Oklahoma 4-H Foundations. **University of Missouri**, moonl@missouri.edu.



Ashley Mullens is an Extension Associate with the Louisiana State University Agricultural Center (LSU AgCenter) in Baton Rouge, Louisiana. For the past two years she has served as the Program Manager for the LSU AgCenter's 4-H Youth Wetlands Education and Outreach Program. The Youth Wetlands Program is a statewide program designed to heighten students' awareness of Louisiana's wetland loss through education and service-learning opportunities for youth in grades 4-12. Since its inception in 2007, the YW program has reached over 150,000 students and 3,000 educators across Louisiana. Ashley also provides supervision to the America's Wetland Conservation Corps (AWCC), which is an AmeriCorps State Program affiliated with the Youth Wetlands Program. AWCC has had 80 members participate in this collaborative effort of organizing and engaging others in wetland restoration projects, resulting in 7,059 volunteers over a three-year term. Ashley has a B.S. in Wildlife Management and Forestry and an M.S. in Agronomy with a specialization in Wetlands Ecology from Louisiana State University. *Louisiana State University, awmullens@agcenter.lsu.edu.*

James Nichnadowicz is a Rutgers Cooperative Extension 4-H Agent in Union County, New Jersey. In addition to managing a traditional 4-H club program, Jim has implemented a summer science program for the past 20 years. Each summer 4-H hires science teachers who travel to day camps located in the most urban parts of Union County to facilitate a wide variety of hands-on science activities. The program reaches 600 underserved youth each summer and features visits from science professionals. The largest portion of support for the program comes from a local corporation. In addition to the summer science program, Jim also trains 4-H club leaders and afterschool staff in the use of science curricula and materials. Lastly, he trains volunteers in the area of science to deliver presentations in elementary schools. In 2010 his "Master Tree Stewards" taught over 2,500 youth about the importance of trees in the urban/suburban environment. **Rutgers University**, *nichnadowicz@njaes.rutgers.edu*.



Sheryl Nolen is a County Extension Agent with Texas AgriLife Extension Service, the Texas A&M University System, in charge of coordinating the 4-H Urban Youth SET Afterschool Programs in Houston. Over the past three years she has partnered with Precinct 2 Youth Services and Precinct2gether Inc. to expand 4-H science programming to afterschool and summer camps at eight school-based sites and community centers in east Harris County. The 4-H science program includes digital storytelling, scientific method, engineering and design challenges, 4-H Aerospace, photography and the Junior Master Gardener® program. Sheryl coordinates 4-H SET Teen Leaders to teach and mentor youth digital media and movie making at afterschool and summer programs. She also coordinates the Junior Master Gardener® programs at 25 school sites reaching over 3,000 inner city youth in the Houston Independent School District. Sheryl serves on the State 4-H Discover Scientific Method (DSM) team and works at the District and County level to coordinate the 4-H DSM Research Poster Contest. Sheryl has a B.S. in Home Economics and a M.S. in Family and Consumer Sciences from New Mexico State University. **Texas A&M University**, *snolen@ag.tamu.edu*.



Lucinda Randolph-Benjamin provides leadership to Cornell University Cooperative Extension's New York City 4-H Youth Development programs. Her work has centered on building youth and adult partnerships, engaging youth in programs that develop leadership and life skills, and equipping youth professionals and volunteers with competencies needed to tackle the emerging challenges of working with youth. Lucinda's Urban 4-H Science programs (K-12) have included Afterschool Universe (Astronomy), Citizen Science, GIS/GPS, In Touch Science, Junior Master Gardener[®], Project Pigeon Watch, 4-H Master Angler program, and so forth. She has partnered with Agilent Technologies to introduce youth (with a focus on young women) to engineering and technical sciences. Lucinda is currently coordinating the Toyota H2O effort that supports the implementation of the 4-H National Science Experiment and the Million Trees Environmental Stewardship Project. Lucinda has a B.S. in Gerontological Studies from City University of New York (CUNY), York College and a MSEd /CSPEd in Correctional Special Education & Behavioral Studies from CUNY, Hunter College. Cornell University, *Ir26@cornell.edu*.

Chad Ripberger is the County 4-H Agent and County Extension Department Head for Rutgers Cooperative Extension of Mercer County in Trenton, New Jersey. For the past nine years he has developed several 4-H youth development programs through partnerships with large afterschool and summer program providers – including the Boys and Girls Club, City of Trenton, Education Works, New Jersey Youth Corps of Trenton, Trenton Teen Leadership Corps, and the YMCA. 4-H Science programming has included science-themed digital storytelling, robotics, Design It! and Explore It!, and the Junior Master Gardener® program. Chad leads New Jersey's involvement in the National Partnerships for After School Science project (through EDC, Inc.), a three-year effort that has developed a statewide OST science trainer network supporting 95 afterschool sites. He also organizes a weeklong campus-based summer science program for high school youth from targeted cities throughout NJ. Chad has a B.S. in Agricultural Education and a M.S. in Educational Administration from Purdue University. **Rutgers University**, *ripberger@njaes.rutgers.edu*.



Danielle D. Rudolph is an Urban Regional Extension Agent for the Alabama Cooperative Extension System. She provides leadership to the Youth Development and Family and Child Development programs within the Montgomery Metropolitan Statistical Area, which includes Montgomery, Autauga, and Elmore Counties. Throughout the past two years she has implemented a number of youth programs focusing on leadership development, peer mentoring, and career exploration. Danielle has worked closely with the state youth development specialist and other urban agents to host a series of 4-H SET workshops through the annual Teens and Tweens Empowerment Conference held on the campus of Alabama A&M University. Danielle, along with county level colleagues, conducts workshops with urban youth under the state initiative, "Ready? SET to Explore Forensics." Danielle has earned a B.S. in Human Development and Family Studies from Alabama A&M University and a M.S. in Human Development and Leadership from Murray State University. **Alabama A&M University**, ddr0007@aces.edu.

Jessica Pierson Russo is an Assistant Extension Professor in the Minnesota Urban Youth Development Office (Minnesota Urban 4-H), which is part of the Center for Youth Development and the University of Minnesota Extension. She is a certified language arts teacher and a naturalist, and since 1997 has worked with youth across the US in public, private, and alternative schools in formal and informal settings. Since 2004, she has worked with Minnesota Urban 4-H to develop and pilot models of urban youth programming, including a 4-H leader support program, a community partner pairing system, and a family empowerment strategy. She has also developed curricula related to experiential learning, international education, and global youth leadership and citizenship. Jessica holds a master of education in youth development leadership from the University of Minnesota with an emphasis on racial reconciliation and experiential education. **University of Minnesota**.

Steve Wagoner is a metro youth development educator with University of Illinois Extension. Based in the St. Louis Metropolitan Area, he partners with neighborhood associations, schools, community centers, youth serving organizations, and science-affiliated entities to develop subject-driven programs and organized youth groups. He specializes in leadership development for youth and adolescents. Steve's 28-year career in 4-H youth development engages youth and adult volunteer leaders in programs tailored for the diverse audiences he serves. He annually facilitates a high school leadership convention at an environmental center for multiple states and co-leads a youth-led community garden initiative. Steve holds a master's degree in Extension Education from the University of Illinois and a bachelor's degree from Southern Illinois University – Carbondale. He is a member of the National Association of Extension 4-H Agents, the Association for School and Curriculum Development, the Association of Volunteer Administrators, and the Illinois Extension Professionals for Youth Education. **University of Illinois**, *wagoners@illinois.edu*.



Philson A. A. Warner is the Founding Director of the Cornell University Cooperative Extension (CUCE), NYC Hydroponics, Aquaculture, Aquaponics Teaching and Demonstration Learning Labs, and is the Coordinator of Science, Technology and Sustainable Agriculture at CUCE, NYC. Over the past 30 years he has invented and developed the following technologies: The NDFT Hydroponics Technology, BHS Aquaculture Technology, NDFT/BHS Aquaponics Technology and several others. He has authored several publications, including: *Grow With The Flow, Hydroponics Learning Model, Aquaponics Techniques, Hydroponic Gardening In The Home, Basic Plant Propagation Techniques, and co-author of New York Aquaculture (Status, Constraints and Opportunities).* He has also developed science and technology programs for school, afterschool, and summer programs through partnerships with the New York City Department of Education School Systems, New York City Department of Youth and Community Development, the Police Athletic League (PAL), NYC Green Thumb, and NYC Housing Authority Garden Program, to name a few. He is the recipient of a B.S. in Agriculture, a B.A. in Medical Microbiology and Medical Parasitology, and an MPA with an emphasis in Community Health. **Cornell University**, *paw14@cornell.edu*.



Janet Martin



Urban 4-H Specialist Iowa State University Iowa City IA *jmmartin@iastate.edu*

4-H in the Corridor STEM Initiative Partnership

Abstract

The Corridor STEM Initiative in Iowa is an initiative in the Cedar Rapids/Iowa City Technology Corridor. The initiative is aimed at engaging Iowans to help shift the culture and mindset around science, technology, engineering, and math so that Iowa is recognized as a premier state in delivering this important brand of education.

4-H youth development staff in Johnson and Linn Counties in Iowa have been involved in the Corridor STEM Initiative since its inception, serving as leaders in "out-of-school" planning, implementation and program delivery. Research shows the importance of informal science education, and a partnership between in-school and out-of-school educational programming in implementing science education.

4-H Achievements to date include:

Afterschool STEM programming: Since 2007, Extension youth development specialist Janet Martin has led training for afterschool sites and supervised 4-H staff who taught Engineering is Elementary[®] and ISU Extension SET curriculum at program sites in Linn and Johnson Counties. More than 500 youth have participated.

Summer engineering/robotics camps in Linn/Johnson counties led by 4-H staff: Engineering is Elementary© has been offered to 500 youth; forty youth participated in GEAR-Tech-21 (Geospatial and Robotics Technologies for the 21st Century) camp.

Science/rocketry workshop with the Iowa Children's Museum for afterschool staff: Forty staff members from Johnson County afterschool programs learned science and rocketry principles to share with their students.

4-H on Wheels: For more than 20 years, Summer 4-H on Wheels has travelled to parks, apartment complexes, and schools in Iowa City and Johnson County. Science has been the core of the "hands on" learning at the two-hour weekly sites for 7 weeks during the summer. Five hundred youth participated in summer 2010.

Program Needs

The United States is falling dangerously behind other nations in developing its future workforce of scientists, engineers, and technology experts. America now faces a future of intense global competition with a startling shortage of scientists. Only 18 percent of US high school seniors are proficient in science (NAEP, 2005). A mere 5 percent of current US college graduates earn science, engineering, or technology degrees compared to 66 percent in Japan and 59 percent in China. Couple these statistics with the fact that current scientists and engineers are retiring in record numbers, and it becomes clear the US faces a crisis in its ability to keep up with increasing demand for professionals trained in these fields. To ensure glob-



al competitiveness, educators must act now to prepare the next generation of science, engineering, and technology leaders.

The 4-H Youth Development Program is directly connected to the research and resources of the 106 land grant universities and colleges of the Cooperative Extension System. This connection strategically positions 4-H to strengthen US global competitiveness and leadership.

Targeted Audience

The out-of-school audience includes kindergarten through sixth grade youth in the Iowa City/Cedar Rapids corridor. In afterschool programming, emphasis includes a focus on working with girls and youth from all socio-economic groups.

Program Goals and Objectives

- To increase youth's understanding of science, technology and engineering in everyday life.
- To teach youth to enhance and apply their knowledge in science, technology and engineering through hands-on experiments.
- To increase youth's understanding of STEM content and improve student interest in STEM learning and careers.

Program Design/Curricula and Materials

Curriculum for the out-of-school programs was based on:

- Iowa 4-H SET Initiative curriculum through Iowa State University Extension including aerospace, environmental, physical science, and engineering (<u>http://www.extension.iastate.edu/e-set/</u>).
- VAST (Van Allen Science Teaching) Center, Grant Wood Area Education Agency
 The Corridor STEM Initiative is coordinated by the Grant Wood Area Education Agency, located in Cedar
 Rapids, Iowa. Leadership for the initiative, including curriculum design, is led by the science consultants at
 the Grant Wood AEA (<u>http://www.aea10.k12.ia.us/vastscience/index.html</u>).
- Engineering is Elementary©, Museum of Science, Boston
 The curriculum was utilized for the summer programs coordinated through 4-H, the University of Iowa College of Engineering, and the Grant Wood AEA (<u>http://www.mos.org/eie/</u>).

Knowledge and Research Base

From *After-School Science and Technology Fact Sheet*, The Coalition for Science Afterschool, University of California, Berkeley, California, <u>http://afterschoolscience.org/projects/index.php.</u>

80% of future careers will demand knowledge of science and technology.

Scientists do not all work in labs, and not all engineers build bridges. Science and technology are needed in almost every career now and in the future. If children think science and technology is not for them, they will find themselves left out of most careers.

Being interested in science may be more important than being good at science.

It is no surprise that children will not pursue something that they do not find interesting or do not think is available to them. Interest in science among 8th graders is proven to be a better indicator than test scores for predicting future career choices.

Schools alone cannot create future scientists and engineers.

Science in school is necessary but not enough to support students' interest in science. Children need time to explore and discover on their own, with the help of programs that take place out of school. After school, weekend, and summer programs are important opportunities for youth to explore and discover science and technology.

There are thousands of resources available to build science and technology programs for kids before and after school and in the summer.

Communities must take the lead in using science and technology available resources in ways that are appropriate locally.

Partners

Through cooperation with the partners in the out-of-school committee of the Corridor STEM Initiative, 4-H was able to reach hundreds of youth in science, technology and engineering.

• University of Iowa College of Engineering

Rebecca Whitaker, K-12 Coordinator for the University of Iowa College of Engineering, worked with 4-H to provide leadership to the summer *Engineering is Elementary* programs. The initial 2007 summer program was funded through a grant written by the University of Iowa Foundation.

- VAST (Van Allen Science Teaching) Center at the Grant Wood Area Education Agency, Cedar Rapids, Iowa
 Jeanne Bancroft, VAST Center Director, and AEA science consultants were instrumental in securing funds from
 the Iowa Legislature for the afterschool grants. The Corridor STEM Initiative is funded through the
 Iowa Math and Science Education Partnership (IMSEP), located at the University of Northern Iowa
 (http://www.aea10.k12.ia.us/vastscience/index.html).
- The Iowa Children's Museum
 The museum partnered with 4-H to lead a "Take Flight" aerospace workshop for afterschool providers in Johnson County (<u>http://www.theicm.org/exhibits/take-flight</u>).
- Schools in Linn and Johnson Counties

*F*or the last three school years, 4-H Afterschool delivered weekly science education at four 21st Century Community Learning Center sites in the Iowa City Community School District.

Rockwell Collins

Rockwell Collins is an outstanding business partner in the Corridor STEM Initiative; they provide funding and support for the FIRST[®] Lego League and FIRST[®] Tech Challenge. At youth programs, Rockwell engineers encourage youth to participate in school day and out-of-school education; the engineers are excellent "role models" for the youth. In November 2010, Rockwell Collins awarded a \$10,000 grant to Johnson County Extension/4-H for robotics equipment for future out-of-school programming.





- Other CSI partners are: The Science Station in Cedar Rapids, Kirkwood Community College, The Workplace Learning Connection School Districts in Linn and Johnson Counties, and Alliant Energy.
- GEAR-Tech-21 at the University of Nebraska, Lincoln (a 4-H SET program funded by the National Science Foundation)

GEAR-Tech-21 teaches robotics, GPS, and GIS technologies through building and programming a robot, navigation, and mapmaking activities. The summer 2010 camps were funded through the GEAR-–Tech-21 grant and the Johnson County Extension Council.

Funding

In summer 2007, the CSI Summer STEM Program Engineering is Elementary[©] was funded through a \$25,000 grant from the University Iowa College of Engineering and the University of Iowa Foundation through the Roy J. Carver Charitable Trust, and \$10,000 through the Grow Iowa Value Funds through Kirkwood Community College.

For the CSI afterschool grants, the Grant Wood Area Education Agency and the CSI partners were annually awarded \$180,000-\$200,000 for the 2007-2011 school years. This money from the Iowa legislature through IMSEP funded the afterschool mini-grants at up to 11 afterschool sites annually. These funds were also utilized for the afterschool staff training "Take Flight" at The Iowa Children's Museum in Coralville.

The Johnson County Extension Council provides funding for the 4-H on Wheels program.

Staffing

Part-time staff have been employed for the summer and afterschool program; the majority of staff are students at the University of Iowa in Iowa City. 4-H teen volunteers have assisted at summer and afterschool programs. Each semester or season, the Johnson County Extension Council provides a \$100 honorarium for 10 hours of volunteer work with the urban 4-H program.

Program Delivery

Afterschool STEM programming: Since 2007, Extension youth development specialist Janet Martin has led training for afterschool sites and supervised 4-H staff who taught Engineering is Elementary[©] and ISU Extension SET curriculum at program sites in Linn and Johnson Counties. More than 500 youth have participated.

Summer engineering/robotics camps in Linn/Johnson counties led by 4-H staff: Engineering is Elementary[©] has been offered to 500 youth; forty youth participated in GEAR-Tech-21 camp.

Science/rocketry workshop with Iowa Children's Museum for afterschool staff: Forty staff members from Johnson County afterschool programs learned science and rocketry principles to share with their students.

4-H on Wheels: For more than 20 years, Summer 4-H on Wheels has travelled to parks, apartment complexes, and schools in Iowa City and Johnson County. Science has been the core of the "hands on" learning at the two-hour weekly sites for seven weeks during the summer. 500 youth participated in summer 2010.

Recognition of Participants

Each May, a recognition event is held at the University of Iowa for all teachers and youth who participated in the mini-grants through the Corridor STEM grant program. Staff from the Grant Wood AEA, and representatives from businesses and the University of Iowa speak with the students about careers in STEM. The youth share their learning through an open house event. At each summer program, youth present their learning through a parent program at the conclusion of the experience.

Program Evaluation and Outcomes/Impact

From the 2007 summer program, parents and students pointed out that among the strengths of the program was its use of hands-on STEM experiences to encourage the students' use of higher-level thinking skills. The parents commented that their students' explanation of the Engineering is Elementary© activities included information about why certain designs did and didn't work, and what was needed to make improvements in the future. Written responses included:

- He came home and wanted to try projects that you did with the kids at the program. He enjoyed it and learned.
- *He said more than I can fit here. He enjoyed the projects, repeated them at home and told us of his accomplishments with the projects. He had fun.*
- She was eager to come home and try things. We had to buy a half gallon of lemonade so she had the right container for a windmill. Cool!
- *He loved the program and looked forward to it all week. He liked to explain how his designs worked and if they didn't why they didn't and what he did to make them work the next time.*
- She enjoyed the hands on; it helped her to retain information when she is involved in the process. Much more effective learning style than reading and looking at pictures.
- He talked about races, made a boat at home and floated it in the tub, explained sail design process (had several tries until one made it), didn't want to miss a session.

A parent and a process improvement engineer at Quaker Oats, said,

I am happy my daughter was able to participate in the STEM program this summer. I am a chemist and we like to do science projects together at home. I am happy to see an emphasis given to the Math/Science/ Engineering subjects. I was also pleased to see the emphasis given to girls getting involved with the sciences. This will be a vital program for the future of the boys and girls to remain involved with the sciences.

Evidence of Sustainability

Cooperation between the partners has provided sustainability for CSI programs. Rockwell Collins, based in Cedar Rapids, Iowa, has been a key partner in the initiative; they support the FIRST Lego League and FIRST Tech Challenge programs for 4-H, schools and other youth organizations. Due to 4-H participation and partnership in CSI, Rockwell Collins has awarded \$10,000 to Johnson County 4-H for robotics and science programming.





Considerations for Replication

The Corridor STEM Initiative out-of-school committee meets monthly to review current programming and look for opportunities to expand the program. Through the grant from the Iowa Legislature, a coordinator and "teacher in residence" at the Grant Wood AEA provide leadership for the initiative. Monthly meetings for the partners are vital for success and continuation of the initiative. Since 2007, Dick Whitehead, superintendent, College Community School District, Cedar Rapids, Iowa has been the chair of the out-of-school committee for CSI and Jim Thornton has been the initiative coordinator; they have been vital for program growth and development.

For more than 20 years, Johnson County 4-H/Extension has led 4-H on Wheels summer science programming. The Corridor STEM Initiative brought together partners to expand the out-of-school science learning in the corridor. The funding and top notch partners in the initiative helped "launch" science programming in Johnson County 4-H Afterschool and summer programming.

References

Corridor STEM Initiative: http://www.corridorstem.org/

In Partnership With

IOWA STATE UNIVERSITY University Extension





Marianne Bird



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4-H On the Wild Side

Abstract

4-H On the Wild Side aims to enthuse and educate elementary school children about nature and the outdoors, and encourage community involvement and activism in teenagers. It is both a service learning experience for teens who plan and lead the program, and an environmental education experience for elementary school-age participants. Over several months, teen staff work in partnership with adult volunteers to orchestrate and deliver weekend camp programs to 4th, 5th, and 6th grade students attending schools in low-income neighborhoods. Teens receive training in environmental curricula and in teaching inquiry-based science, then design and deliver two weekend programs. Up to 80 children attend each session, rotating through the teen-led activities to learn about ecosystems, migration, habitat and other environmental lessons. Since 2000, over 1,500 youth have participated. Annual evaluations reveal consistent outcomes for the program including significant knowledge gain for participants, growth in leadership skills for teen presenters, and a sense of community contribution.

Program Needs

The purpose of On the Wild Side is to expand outdoor learning and wilderness opportunities for youth who would otherwise not likely have access to the natural environment. Many children today, especially those from urban, economically disadvantaged communities, have not had the opportunity to experience and understand nature. Yet, these children are the stewards of our future and the ecological health of our planet.

Targeted Audience

4-H On the Wild Side serves two audiences:

- 1. Elementary students in grades 4-6: Approximately 130 children from low-income neighborhoods participate in one of two weekend programs. At least 50% of students qualify for free or reduced lunches at our partnership schools. Seventy-five percent are ethnic and racial minorities and few, if any, have had the opportunity for wilderness experiences.
- 2. *Teenage volunteers:* Twenty teenage volunteers, some from the 4-H Club but most recruited from the community, lead the effort. Over 40% of teens are non-white.

Program Goals and Objectives

Since 2000, On the Wild Side has brought environmental education and outdoor living experiences to over 1,500 youth from Sacramento's most economically disadvantaged neighborhoods. Project goals for the children participating include:



- Expanded knowledge of the natural world and systems within it.
- The development of an enthusiasm for nature and outdoor living experiences.
- An appreciation for the importance of conservation and environmental stewardship.
- A fun, positive experience with peers and staff in the outdoor setting.

In addition, teens involved as project planners and leaders are expected to gain:

- Understanding and application of SET Abilities in teaching science activities.
- Skills and confidence in program planning and delivery.
- An increased awareness of the importance of civic engagement.
- Feelings of satisfaction and pride in successful project completion.

Program Design/Curricula and Materials

4-H On the Wild Side utilizes tested curricula from which the teen staff choose their lessons. Material is drawn from different resources depending on the program's focus, which changes from year to year.

Curricula used includes *Project Wild, Project Wild Aquatic,* and *Project WET* (Council for Environmental Education); *Project Learning Tree* (American Forest Foundation); *Junior Master Gardener®* (Texas Agricultural and Extension Service), *SERIES—Nature's Partners: Pollinator Protection,* and *Oak Woodland Wildlife* (University of California Agriculture and Natural Resources), *Water Inspectors* and *Wetland Protectors* (California Aquatic Science Education Consortium and University of California Agriculture and Natural Resources).

Knowledge and Research Base

4-H On the Wild Side emphasizes experiential and inquiry based learning in areas of environmental science, cross-age teaching and youth adult partnerships.

Experiential learning is the process of creating knowledge through the transformation of experience (Kolb, 1984). It involves a direct encounter with the phenomenon being studied. Components of experiential learning (often called the experiential learning cycle) include a concrete experience, observation, reflection, generalization of abstract concepts, and application (Kolb, 1984). Environmental education concepts lend themselves especially well to experiential learning. In On the Wild Side, children spend a weekend immersed in the natural setting— sleeping under the stars, exploring the lake, listening to frogs at night – and all these provide an essential backdrop to both the cognitive and affective components of learning. Curiosity about the environment, and subsequent exploration, invite youth to discover and build understanding. Activities also incorporate inquiry based methods where learners are not handed correct answers but, through an active process, discover the answer themselves. There is evidence that African American youth and other youth from non-white ethnic communities learn better with inquiry based approaches (Hmelo-Silver, et al, 2007, Lynch et al, 2005).

Cross-age teaching, where teenagers instruct younger children, has received merit as a promising strategy for engaging elementary age students. There is evidence that teens can have a positive impact on the knowledge,

behavior and attitudes of younger children (Meyer et al, 2000). Teens are natural role models for younger children who are eager to emulate them (Bandura, 1977). In addition, engaging teens in leadership roles benefits teens as well. Some reported benefits include learning to be more organized, responsible, and involved in positive change in their community (Hoover & Weisenback, 1999). Teens that volunteer for On the Wild Side are a diverse group. This helps build connection with elementary students who are from similar social and ethnic communities.

Youth adult partnerships are relationships between young people and adults where there is mutuality in teaching, learning and action (Zeldin, McDaniel, Topitzes & Lorens, 2001). Young people's voice, influence and decision-making are on par with adults. In On the Wild Side, teens are trained in experiential and inquiry methods and then have full ownership over the planning and decision-making to develop their lessons and activities, supported by adult guidance. Adult program staff intentionally practice strategies that characterize effective youth adult partnerships – creating non-hierarchical structures for equal participation of youth and adults, practicing respectful communication, and valuing young people's contribution to the process. Youth and adults build the project together to serve an authentic community need (Camino, 2000).

Partners

On the Wild Side began as a collaborative endeavor between 4-H, Camp Fire Boys and Girls, the Sierra Club, and the City of Sacramento START afterschool program. Over the years some players have changed, but the essence of true partnership remains constant: all players are invited to fully participate in the creation of program experience, and the gifts and needs of each organization are valued and met.

Current project collaborators include:

- Afterschool programs, and elementary and charter schools—provide students to attend the program and financial support.
- Sacramento County 4-H Youth Development Program—provides leadership, training, program management and financial support.
- California State University Sacramento (CSUS), Science Education Equity Program—provides adult volunteers, technical support in science education, and financial support.
- University of California 4-H Center for Youth Development—provides assistance with program evaluation.

Funding

On the Wild Side draws its financial support from fees, grants, and donations. Not counting the cost of the 4-H staff who organize the project or the teachers and afterschool program leaders who attend with their children, the project budget runs between \$8,500 and \$9,500 annually. This includes camp rental, food, program supplies and bus transportation. Schools and afterschool programs pay a modest fee (\$300 per 20 students) to participate. Local 4-H and community grants cover about one-third of the cost, and the balance comes from donations from service groups, individuals, and businesses. Teens are engaged in identifying funding sources, grant writing, and making presentations to community groups. The funding sources vary from year to year, but the project has never struggled to find financial support.





Staffing

A primary reason the program budget is comparatively small is the large volunteer force that powers On the Wild Side. Though a 4-H staff member supports program planning and delivery, the cooks, lifeguards, nurses, teen counselors, adult coaches and chaperones are all volunteers.

A "core team" of experienced teens and adults meets in the fall and oversees the program administration (budget, funding, training, recruitment). Program volunteers are recruited primarily through word of mouth, postings at high schools and CSUS, and, to fill skill-specific positions like nurse, by invitation. Teens and adult volunteers who serve as camp staff are often new to 4-H, and have heard about the project in seeking service opportunities. Many identify us through their school or the internet in their quest for community engagement opportunities. Teens work in teams to deliver the program. Adult volunteers are matched with the teen teams and serve as coaches.

Beginning in February, the teens and adult program staff attend monthly meetings where they plan the session they will deliver at camp. Additionally, the staff attends a day-long Saturday training and a weekend retreat at camp where they practice delivering their session to peers. Training includes sessions on inquiry-based science, age characteristics of 4th-6th graders, and teambuilding activities.

Program Delivery

Two On the Wild Side weekend camping experiences happen in late May or early June. Sixty to seventy 4th, 5th, and 6th grade children from the Sacramento area attend each session with their classes or afterschool programs. Participants rotate through the teen-led activities to learn about different topics.

Participants come from school and after school sites, most from the city of Sacramento. A few weeks prior to the camp, program administrators visit the sites to deliver an informational meeting for students, staff and parents. Participants and their parents see photos of the facility, learn what to expect, and have an opportunity to ask questions. Adults, usually teachers and after school program staff, attend camp with their students.

Participants arrive by bus Saturday morning. They sleep outside on decks, and teenagers are assigned to each living group (denoted by school site and gender). On Saturday afternoon and Sunday morning participants rotate through six teen-led learning sessions focusing on topics like ecosystems, migration, habitat or water properties. Activities may include games, simulations, observations, and exploration. Teen teachers are coached not to "tell" information to students, but to allow the children to make discoveries on their own. As much as possible, activities are designed to allow participants not to *learn* about science, but to *become* scientist themselves. For example, one popular activity involves exploring living organisms in the lake: Using nets and buckets to collect specimens, examining with hand lenses or dissecting scopes, and drawing and identifying what is found. Another example of student-scientist activities included a study of the lake water and using instruments to measure turbidity, temperature, pH, salinity, and microorganisms.

Participants also have the opportunity to paddle a canoe, sing around a campfire, and fall asleep under the stars. The evening includes a campfire, songs and skits, and evening program. The participants leave Sunday afternoon.

Recognition of Participants

Teen and adult staff celebrate their accomplishment at an ice cream parlor following their program evaluation, a week or two after the last camp weekend. Thank you notes, letters of recommendation, and occasionally invitations to present at conferences and community events are other forms of volunteer recognition.

Program Evaluation and Outcomes/Impact

Since it began in 2000, On the Wild Side has been evaluated annually. The evaluation examines the following program objectives:

- significant increase in knowledge of environmental concepts for participants,
- positive attitude and enthusiasm for the natural world for participants,
- significant change in life skills, leadership and/or sense of contribution to the community for teens, and
- enjoyment of the experience for all participants.

A compilation of 10 year's data for the project is complete and in press, soon to be released in *Advances in Youth Development: Research and Evaluation from the University of California Cooperative Extension (2001-2010),* a University of California publication.

Methods

Data for the evaluation were collected through several means. To measure student learning, a multiple choice/ short answer test is designed around the lessons teens present at camp. Students take the pre-test prior to arriving at camp, the post-test just before departure, and the matched pairs are compared with paired samples t-tests in SPSS. Participants reflect on their learning in journals, and these are collected and also inform the evaluation. At the end of camp, students and adult chaperones fill out a survey where they rate their experience, share highlights and suggestions for improvement, and what they have learned.

To measure the impact on teen leaders, youth staff members take an anonymous survey at the conclusion of the program to rate, on a five-point Likert scale, their relationships with adults, their environmental awareness, and their sense of contribution. A retrospective pre-post test also asks them to assess their leadership skills (making presentations, sharing opinions with peers and adults, organizational skills, working with younger youth) before and after their experience. Open-ended questions on the survey provide qualitative data about the teens' experience. In some years, focus groups with teen, adults, and program partners provided more in-depth information on youth-adult partnership, personal growth, and their feelings about the project.

Findings

The data consistently show that participants gain knowledge about the environment. Each year there is a significant difference in the participant's pre-and post-test scores. The students' journals reflected learning, especially through direct experience.

I learned about the prey and predator and that a bird is both—they eat worms and we eat them.





I learned that mosquitoes were born in water.

You can find a lot of snails in the water. You can find dead skin, snails, frogs, and worms and even frys, which is baby fish that just was born.

A madrone tree is smooth and cold.

Discoveries include both affective and cognitive elements and appear to be born of first-hand observations as participants explore the environment through both structured and unstructured activities.

Figure 1: Five years of pre- and post-test scores for elementary school participants (n=514). The difference is significant at (p=.00) level.



Participants engage with the natural world. For many students, the program creates opportunities to explore and encounter nature in ways they have not before. For each year, an average of 60% of children reported that this was their first outdoor living experience. The end-of-camp survey and student journals reveal a litany of first-time experiences for children: Seeing bats, sleeping outside, looking for bugs, paddling a canoe, seeing shooting stars or the Milky Way, swimming in a lake, finding lizards, feeling the campfire, among others. For some, the new environment created feelings of trepidation, and as these were overcome, a sense of accomplishment accompanied mastered challenges.

We had so much fun at canoeing. I think we were the best at backing up. I was with Scott and this boy named Jordan. We had the funnest [sic] time. At first we were a little scared. We all were. But I liked it in the end.

-5th grade participant

The newness of the experience can raise anxiety for some participants, and not all embraced the rustic environment. However, nearly all participants (an average of 96% for all years) rated their experience as excellent or good. Students repeatedly stated on surveys that the program could be improved by making it longer.

Teens grow in leadership skills. The retrospective pre-post test indicates teens perceive growth in making a presentation, sharing their opinions with adults, sharing their opinions with teens, organizing their time, organizing supplies and working with others.

Figure 2: Teens self-reported life skills before and after camp



When teens reflected on how they changed through the experience, four themes arose: personal growth, changes in their perception, a sense of efficacy, and skill development. Over 40% of teens listed gaining tangible skills, including working with children and speaking in front of others.

I've become a more responsible, flexible and compassionate leader. Plus, I've learned more about nature through teaching than I could have ever learned in a classroom.

Journal entries and observations verified that each time they taught their lesson, the session improved in content and efficiency, and their confidence as presenters grew.

Teens feel that they contribute to their community. A teen staff position requires a significant time commitment. The vast majority (99%) of teens felt as though they made an important contribution in their community through the project.

I feel like a more important person for having given the kids that opportunity and making everyone's day. I feel great after every weekend, knowing I've helped make memories . . .

Evidence of Sustainability

On the Wild Side has run every year since 2000. As mentioned above, the large volunteer base that leads and supports the effort is a pivotal part of its longevity. Many staff have great ownership and dedication to the project. Programs and schools that attend look forward to returning and are committed to helping financially.

Awards or Other Recognition Received for the Program

4-H On the Wild Side was a Blue Cross Community Service Honoree. It has been featured at a national CYFAR (Children, Youth and Families at Risk) conference and at the American Camp Association Research Symposium.

Considerations for Replication

This type of project lends itself well to reaching new teen audiences. The program has not found it difficult to recruit teens (and young adults) to serve as camp staff. Most are new to 4-H. The project has many elements that appeal to them: working with friends, meaningful leadership roles, authority, and a fun setting.

Multiple funding sources provide sustainability. The teachers and afterschool programs who participate are eager to bring this type of fun, engaging learning experience to their students and are willing to find funds to make it happen. Teens are effective presenters to service organizations and other funders.





References

Bandura, A. (1977). Social Learning Theory. New York: General Learning Press.

- Bird, M. & Subramaniam, A. (2011). Teens as teachers enhance environmental learning and personal skills through service learning. In A. Subramaniam, K. Heck, R. Carlos and S. Junge (Eds.), Advances in <u>Youth Development:</u> <u>Research and Evaluation from the University of California Cooperative Extension (2001-2010)</u>. Davis, CA: University of California Department Agriculture and Natural Resources.
- Camino, L. (2000). Youth-adult partnerships: Entering new territory in community work and research. *Applied Developmental Science*, 4, 11-20.
- Hoover, A.B., & Weisenbach, A. (1999). Youth leading now: Securing a place at the table. *New Designs for Youth Development*, 15(3), p. 29-36.
- Kolb, D. A. (1984). <u>Experiential learning: Experience as the source of learning and development</u>. New Jersey: Prentice-Hall.
- Hmelo Silver, Duncan & Chinn. (2007). Scaffolding and achievement in problem-based and inquiry learning: A response to Kirchner, Sweller, and Clark (2006). *Educational Psychologist*, 42(2), 99-107.
- Lynch, S., Kuipers, J., Pyke, C., & Szesze, M. (2005). Examining the effects of a highly rated science curriculum unit on diverse students: Results from a planning grant. *Journal of Research in Science Teaching*, 42, 921–946.
- Meyer, A., Nicholson, R., Danish, S., Fries, E., & Polk, V. (2000). A model to measure program integrity of peer-led health promotion programs in rural middle schools: Assessing the implementation of the sixth grade goals for health program. *Journal of Educational and Psychological Consultation*, 11(2), p. 223-252.
- Neill, J. T. (2002). <u>Meta-analytic research on the outcomes of outdoor education</u>. Paper presented to the 6th Biennial Coalition for Education in the Outdoors Research Symposium, Bradford Woods, IN.
- Wise, K.; and J. Okey. A Meta-Analysis of the Effects of Various Science Teaching Strategies on Achievement. *Journal of Research in Science Teaching*. 20 (1983): 419-435.
- Zeldin, S., Camino, L. & Mook, C. (2005). The adoption of innovation in youth organizations: Creating the conditions for youth-adult partnerships. *Journal of Community Psychology*. 33(1), 121-135.
- Zeldin, S., McDaniel, A. K., Topitzes, D., & Lorens, M. B. (2001). Bringing young people to the table: Effects on adults and youth organizations. CYD Journal, 2(2), 21-27.

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4-H SLO Scientists

Note: Components of this report were extracted from an unpublished document (Enfield, Leeland, Ponzio & Marzolla, 2010) prepared as a funding proposal.

Abstract

4-H Youth-Adult Science Clubs (SLO Scientists) is a non-formal science education program developed, piloted and evaluated through the University of California 4-H Youth Development Program in San Luis Obispo County (SLO County). 4-H SLO Scientists is sustainable and adaptable to community-based non-formal science programming, and is aligned with STEM and human development research and best practices. It is also aligned with how scientists go about discovery. Using a constructivist approach to learning, the experiences, materials, and questions posed are simple, but finding the "answers" takes observation, gathering data, developing a solution using lines of evidence, and together with other youth-adult investigators, developing a concept. 4-H SLO Scientists provides settings, science-based co-inquiry experiences, and facilitation encouraging use of science process skills to help participants (youth and a significant adult in their lives) experience - and learn - how to make meaning and find the joy in developing concepts of science.

4-H SLO Scientists operates within the University of California 4-H Youth Development Program, which has a successful track record of taking STEM-focused demonstration programs to scale and sustaining them. The program has operated in SLO County since 1995. 4-H SLO Scientists facilitators are trained in inquiry, experiential learning, and content, which assures fidelity, sustainability and ongoing implementation of the program from session to session and year to year.

4-H SLO Scientists provide opportunities for parents or other significant adults to engage with children to strengthen STEM literacy, while providing a positive youth development context designed to create confident, articulate youth skilled in critical thinking. 4-H SLO Scientists combines (a) inquiry-based science learning processes and STEM activities, based on inquiry-based, hands-on curriculum; (b) a strong one-to-one relationship with a parent or other caring adult; and (c) an explicit focus on positive youth development.

Program Needs

There is a significant need to offer programs that help to increase science literacy, interest in science fields, and careers in science, because the nation continues to face declining proficiencies in science, engineering, and technology, as well as a significant workforce shortage in these critical fields.

Targeted Audience

4 H SLO Scientists focuses on developing science clubs where a child aged 8-12 enrolls with an adult (a parent, significant adult or mentor). Club cycles are 8-10 weeks long, each with a specific curricular focus and the child/ adult teams can and often do choose to continue for multiple cycles (with different curriculum). Clubs are facilitated by a trained volunteer recruited for their interest in teaching science to youth.



Program Goals and Objectives

The clubs were designed with these principles in mind: (a) the skills of scientific investigation would be taught in an enjoyable setting; (b) activities would encourage youth/adult pairs to utilize critical thinking skills; (c) participants would be encouraged to utilize their new skills and knowledge to better understand, and to initiate action on, science-related issues in their communities; (d) clubs would provide a safe and fun environment for adults to learn from children and children from adults; and (e) family dynamics of mutual respect would be fostered for all participants, so that involvement might allow a child to develop or strengthen an ongoing relationship with parent/guardians or other caring adults (Enfield, 2000; 2003).

The key goal of the University of California 4-H SLO Scientists program is to create awareness of the relevance and fun of science in our daily lives, and promote lifelong learning of science by all children and the significant adults in their lives outside the formal system of education. 4 H SLO Scientists offers learners of all ages enjoyable opportunities for voluntary, self-directed engagement in STEM-rich non-formal learning environments and experiences. The intention is to create awareness and excitement that leads to future educational and career choices focused in science.

Current Goals

- 1. To increase science literacy and knowledge of and interest in careers in science among youth and their families
- 2. To expand opportunities for community collaborations which foster science education in non-formal settings
- 3. To create a pool of trained facilitators who are skilled in the delivery of inquiry-based curriculums and science activities while promoting positive youth development in the process
- 4. To increase awareness and commitment on the part of parents about the accessibility and importance of science education in their children's lives
- 5. To implement and refine a model of non-formal science education which can be adapted and replicated in diverse communities across the nation
- 6. Have both the child and adult investigators create knowledge at their own levels and share their inquiry and results with their fellow investigators

Program Design/Curricula and Materials

4 H SLO Scientists enables group participation in STEM activities developed in earlier projects, such as the California 4 H Youth Development Science Experiences and Resources for Informal Education Settings (4 H SERIES). In addition, other curricula have been adapted to meet the criteria for 4-H SLO Scientists activities. The co-inquiry model used throughout 4 H SLO Scientists supports the National Research Council model for inquiry experiences aligned with the National Science Education Standards. The 4 H SLO Scientists sequencing and integration of the process skills are aligned with human development research on cognitive development (Lowery, 1998). Most materials are inexpensive and widely available materials that can be purchased in grocery, hobby or craft stores, or are available at no cost from backyards.

Knowledge and Research Base

The nation is facing declining proficiencies in science, engineering, and technology, as well as a significant workforce shortage in these critical fields (National Commission on Teaching and America's Future, 1996). Longitudinal data from the Trends in International Mathematics and Science Study (Gonzales, et. al., 2008) reveal achievement scores for US 4th and 8th graders have been stagnant or declining over the past 12 years (National Science Teachers Association, 2009). Additionally, the Nation's Report Card (National Center for Education Statistics, 2007) revealed that only 18% of US high school seniors were deemed proficient in science in 2005, representing a 0% proficiency growth since 2000. Statistics for minority students show an even more dramatic disparity. Less than 2% of the STEM workforce is Hispanic while almost 20% of the country's youth population is Hispanic (Congressional Hispanic Leadership Institute, 2009).

There is a strong indication that our declining population of scientifically literate youth in the United States may be a contributing factor to the decreasing number of college students pursuing degrees in science-related fields. According to the report from the Committee on Prospering in the Global Economy of the 21st Century (2006),"... Rising Above the Gathering Storm...," only 32% of US undergraduates earn degrees in engineering and science, compared with 66% in Japan, 50% in China and 36% in Germany. Simply stated, too many of our nation's young people do not have the science, engineering and technology skills needed for careers in the 21st century.

This science literacy deficit continues despite the fact that, in 1995, The National Education Goals Report had as its Mathematics and Science goal, "By the year 2000, United States students will be the first in the world in mathematics and science achievement." Arguably, we are not number one, nor are we gaining much ground on the goal for science and mathematics literacy and ability, despite the school-based standards movements, No Child Left Behind legislation, and the variety of State mandated test-based requirements. What we find is that these legislated mandates further the strategy of teaching science (when it is taught at all) as a reading lesson with the goal that the student will pass a standardized paper-and-pencil test.

Informal, community-based education programs like 4-H are important resources that can be utilized to address the growing youth science literacy crisis (Carlson & Maxa, 1997; Kisiel, 2006; Kress, McClanahan, & Zaniewski, 2008) through hands-on, learner-centered strategies that include authentic problem-based learning experiences (Enfield, 2000).

The effectiveness of a strong one-to-one relationship in the positive youth development of children, particularly those classified as "at-risk" has been well documented (Werner & Smith, 1992). Research shows that when parents play an active role, their children achieve greater success as learners, regardless of socioeconomic status, ethnic/racial background, or the parents' own level of education (Henderson & Mapp, 2002; Pate & Andrews, 2006). In addition, the more intensely parents are involved, the more confident and engaged their children are as learners and the more beneficial the effects on their achievement (Cotton & Wikelund, 2001). The National Science Teachers Association (NSTA, 2009) cites research that shows that the involvement of parents and other caregivers in their children's learning is crucial to their children's interest in and ability to learn science.

For many children with parents too overwhelmed or uninvolved to participate in their child's educational experience, a mentor or other caring adult can fill a critical role. In fact, research shows that next to an engaged parent, participation of a caring adult is the most significant protective factor in both problem prevention and





academic success (Benard, 2004). In 4-H SLO Scientists, youth are supported by a bonded relationship with an adult, a parent, other relative or mentor who has learned the skills to support this development and who is an active partner in the child's learning.

In addition to making informal science experiences interesting and fun, 4-H SLO Scientists provide opportunities for "quality time" to be enjoyed by the child and adult as a team working together and involved in using the processes of science to investigate the world. 4-H SLO Scientists' activities are opportunities for youth to develop a bonded relationship, resulting in "resilience" when facing the challenges encountered growing up in today's world.

There are other benefits when young people and adults form a partnership in learning. Youth-adult partnerships in non-formal programs provide greater youth development outcomes for young people than in traditional structures where youth are the recipients of service (MacNeil, 2000). True youth-adult partnerships are formed when there is a scope for mutual learning, rather than when learning is one way (Camino, 2000). Often, both youth and adults find that both parties have something to offer that can advance their learning goals. The goal of science education is to engage the public in science literacy (Karplus, 1969-1970). Adults often times are not science literate themselves. Providing an opportunity for youth and *adults* to engage as partners in informal science learning provides an authentic avenue for science learning for adults as well as youth.

Partners

There have been many agencies and organizations that have been partners in the 4-H SLO Scientists program, including:

- Salvation Army Youth Programs
- Exploratorium/Discovery Center
- Housing Authority sites
- Summer Recreation Programs
- County Library System
- Teachers at school sites

Funding

The initial program start-up funding, which included monies for materials, graphic design, publicity materials and a research associate, were obtained from a mini-grant from the California 4-H Youth Development Center at UC Davis. Ongoing costs for 4-H SLO SCIENTISTS have been very minimal, with the largest expenditure being the salary of a 4-H SLO SCIENTISTS Coordinator (5-6 hrs./wk.). Funds for the salary costs have been obtained from the County 4-H Volunteer Leaders Organization and a number of small grants or gifts from public utilities, service clubs, banks, and other community-based funders. In addition, members are asked to contribute a \$5.00 materials fee when they enroll in a 4-H SLO Scientist Club, but no one is turned away if the materials fee cannot be paid. In fact, the County 4-H Volunteer Leaders Organization has funds set aside to pay the materials fee for any family unable to contribute.

Staffing

The only staffing dedicated to the 4-H SLO SCIENTISTS program is a 0.10- 0.15 FTE (5-6 hrs./wk.) 4-H SLO SCIENTISTS Coordinator.

Program Delivery

The 4-H SLO SCIENTISTS learning model has a trained facilitator working with a group of 6-10 youth/adult pairs, inviting the youth/adult "teams" to engage in seemingly simple experiences and activities together. The facilitators use open-ended questions such as "Is there life in a dirt clod?" and simple materials such as lenses, microscopes, tweezers, and plastic glasses to explore this and similar questions and spark excitement in the discovery. The teams are encouraged to also investigate questions they generate as they go along formulating theories and drawing conclusions. As teams come together in ever enlarging circles, they discuss and explore their individual findings and conclusions, notice their commonalities and differences, and engage in discussing multiple lines of evidence for their favorite conclusion. . . as scientists. The scientific thinking process becomes the basis for participants' experiences.

Engaging the adult partner in the process as an equal participant in the discovery has the added benefit of making informal science experiences a learning opportunity for the adult as well. Interesting and fun interactions, enjoyed by the child and adult as a team working together using science processes to explore the world, have the additional benefit of strengthening the bond between adult and child. Additionally, 4-H SLO SCIENTISTS encourages the adult to value the process of scientific discovery, while creating a supportive network for children choosing to pursue the sparks ignited by the process.

Based on the mix and interests of youth in each of the 4-H SLO Scientists Clubs, facilitators select from a variety of peer-reviewed curricula to implement. Each of these curricula is inquiry-based, follows the experiential learning cycle, and aligns with National Science Education Standards (National Research Council, 1996). 4-H SLO SCI-ENTISTS uses activities and materials that are suitable for dyadic exploration, fit with the constructivist approach and include a positive youth development frame.

The 4-H SLO Scientists program asks the question "How do we create usable knowledge that can be used to better our home, community, and world?" A <u>vignette</u> is provided as an example of how 4-H SLO Scientists session is conducted (Enfield, 2000).

Recognition of Participants

All participants enrolled in 4-H SLO Scientists are members of the San Luis Obispo County 4-H Youth Development program and receive all the rights and privileges of 4-H membership. Members of SLO Scientists participate in 4-H events and activities throughout the year and receive recognition for their efforts. Members of SLO Scientists sometimes are able to participate in special STEM categories at events, such as the STEM category at 4-H Presentation Day, and receive additional recognition because of their science involvement. Facilitators are also recognized for their years of service and are eligible for all 4-H conference scholarships and other forms of recognition offered by the County 4-H Volunteer Leaders Organization.





Program Evaluation and Outcomes/Impact

Since the beginning of the 4-H SLO Scientists program, the most important findings from the evaluations have demonstrated both an increase in the direct involvement in science and scientific thinking for both youth and adult participants, as well as an increase in numerous aspects of positive family dynamics, including increased conversations about "things other than science" and an increase in "family meetings to talk things over and solve problems" (Enfield, 2000; 2003). Specifically, random sampling of participants has indicated that:

- Just over 50% of children reported they spent more time on such things as observing and experimenting after becoming involved in the SLO Scientists Program. Thirty-three percent of the adults reported an increase in this activity.
- Sixty-seven percent of the children reported they "always" or "most of the time" talked with other family members about the activities after each meeting. Ninety-five percent of adults reported doing this.
- Fifty percent of the children reported an increase in talking with her/his adult partner "about things other than science" since joining the program. Fifty percent of the adults also reported more talking with her/his child partner.
- Thirty-six percent of the children reported an increase in "family meetings to talk things over and solve problems" since starting the program. The adult participants reported a 25% increase in family meetings.

Evidence of Sustainability

The program has been operating in SLO County since 1995, and offers participants up to 3-years of involvement in the program. 4-H SLO Scientists has been piloted, evaluated, refined and re-evaluated over the past 16 years.

Considerations for Replication

Through replication and adaptation of the 4-H SLO Scientists model within the context of the 4-H Youth Development framework, 4-H professionals can make significant contributions to the ability of 4-H programs and collaborators to deliver effective STEM education in non-formal settings across the United States. A handbook is available to provide start-up assistance to 4-H SLO Scientist Clubs (Salisbury & Neuhauser, 1999). The 4-H SLO Scientists address the high priority issues of increasing science literacy in youth and significant adults in their lives.

In addition, this project may be applicable far beyond the scope of 4-H. 4-H SLO Scientists provides opportunities for partner organizations to incorporate inquiry-based science into their own programs by providing professional development to staff and volunteers of those organizations, thus expanding the quantity and quality of organizations engaged in effective non-formal science delivery.

References

- Benard, B. (2004). Resiliency: What we have learned. San Francisco, CA: West Ed.
- Camino, L. (2000). Youth-adult partnerships: Entering new territory in community work and research. *Applied Developmental Science*, 4, 11-20.
- Carlson, S., & Maxa, S. (1997). *Science guidelines for nonformal education*. Washington, DC: United States Department of Agriculture, Cooperative Extension Service, Children, Youth, and Family Network.
- Committee on Prospering in the Global Economy of the 21st Century. (2006). An Agenda for American Science and Technology, National Academy of Sciences, National Academy of Engineering, Institute of Medicine; Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future. Washington D.C.: National Academies Press.
- Congressional Hispanic Leadership Institute. (2009). CHLI highlights the growing importance of developing the next generation of STEM professionals. Available online at: <u>http://www.chli.org/news/32238/CHLI-High</u> lights-the-Growing-Importance-of-Developing-the-Next-Generation-of-STEM-Professionals.htm
- Cotton, K., and K. R. Wikelund. (2001). Parent involvement in education. *School Improvement Research Series*. Portland, OR: Northwest Regional Educational Laboratory. Available online at <u>http://educationnorthwest.</u> <u>org/webfm_send/567</u>
- Enfield, R. (2000). SLO Scientists: Families having fun with science clubs. In *Youth Development Programming: Reviews and case studies from the University of California*. M.T. Braverman, R.M. Carlos & S.M. Stanley (Eds.). University of California Agriculture and Natural Resources, Cooperative Extension Publication 3401.
- Enfield, R. P. (2003). SLO Scientists: Families having fun with science clubs. University of California Delivers. University of California, Agriculture and Natural Resources Website, Oakland, California. Available online at: <u>http://ucanr.org/delivers/impactview.cfm?impactnum=156&mainunitnum=0</u>
- Enfield, R. P., Leeland, A., Ponzio, R., & Marzolla, A. M. (2010). 4 H youth adult partnership experiences in science (4 H YAPES): A full-scale development project for creating ongoing family engagement in informal science educationproject narrative. University of California, Agriculture and Natural Resources. Unpublished Document.
- Gonzales, P., Williams, T., Jocelyn, L., Roey, S., Kastberg, D., & Brenwald, S. (2008). Highlights From TIMSS 2007: Mathematics and Science Achievement of U.S. Fourth- and Eighth-Grade Students in an International Context (NCES 2009–001Revised). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.
- Henderson, A. T., & Mapp, K. L. (2002). A new wave of evidence: The impact of school, family, and community connections on student achievement. Austin, TX: Southwest Educational Development Laboratory. Full report available online at <u>www.sedl.org/connections/resources/evidence.pdf</u>; conclusion available at: <u>www.sedl.org/connections/resources/conclusion-final-points.pdf</u>





- Karplus, R. (1969-1970, Winter). Three Guidelines for Elementary School Science. *Curriculum Theory Network*, No. 4, pp. 4-10. Available online at: <u>http://www.jstor.org/stable/1179305</u>
- Kisiel, J. (2006). Urban teens exploring museums: Science experiences beyond the classroom. *American Biology Teacher*, 68(7), 396, 398-399, 401.
- Kress, C. A., McClanahan, K., & Zaniewski, J. (2008). *Revisiting how the U.S. engages young minds in science engineering and technology: A response to the recommendations contained in The National Academies' "Rising Above the Gathering Storm" report.* Washington, DC: National 4-H Council.
- Lowery, L. (1998). *The biological basis of thinking and learning*. Full Option Science System, Lawrence Hall of Science, Berkeley, CA: The Regents of the University of California.
- MacNeil, C. (2000). *Youth-Adult Collaborative Leadership: Strategies for Fostering Ability and Authority.* Michigan: UMI Dissertation Services.
- National Center for Education Statistics. (2007). *The Nation's Report Card: Trial Urban District Science 2005 Snapshot Reports* National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington. Available online at: <u>http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2007455</u>
- National Commission on Teaching and America's Future. (1996). What Matters Most: Teaching for America's Future. Report of the National Commission on Teaching and America's Future. Available at: <u>http://www.teaching-point.net/Exhibit%20A/What%20Matters%20Most.pdf</u>

National Research Council. (1996). National science education standards. Washington D.C: National Academy Press.

- National Science Teacher's Association (NSTA) A Position Statement. (April 2009). Parent Involvement in Science Learning. Available online at: <u>http://www.nsta.org/about/positions/parents.aspx</u>
- Pate, P. E., & Andrews, P.G. (2006). *Research summary: Parent involvement*. Westerville, OH: National Middle School Association (NMSA). Available online at: <u>www.nmsa.org/Research/ResearchSummaries/ParentIn-volvement/tabid/274/Default.aspx</u>
- Salisbury, H., & Neuhauser, J. (1999). Salisbury, H., & Neuhauser, J. SLO SCIENTISTS: A guide to beginning a club in your community. Regents of the University of California, UC Cooperative Extension 4-H Office.University of California, San Luis Obispo County. Available at: <u>http://urban4hscience.rutgers.edu/resources/slo-scientists/SLO-Scientists-Guide-to-Beginning-a-Club.pdf</u>
- Werner, E., & Smith, R. (1992). *Overcoming the Odds: High-Risk Children from Birth to Adulthood*. New York: Cornell University Press.

In Partnership With









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Adventure Central

Abstract

Adventure Central is a trusted, community-based, positive youth development partnership between 4-H, Ohio State University Extension, the University of Dayton and Five Rivers MetroParks. Adventure Central has served at-risk youth and their parents in the West Dayton community for over 10 years. With the aid of the natural world, staff nurture families in life-changing activities that strengthen values, build lasting life skills, and empower youth to explore life's possibilities. A high intensity, long duration and high frequency programming approach is used, and the primary delivery modes include afterschool, day camp, and teen programs. Parent and family engagement is a high priority. The program includes leader- and learner-directed opportunities for youth to engage with and experience the natural world. A special feature of Adventure Central is that the center is physically located within a 60-acre urban park. Partnerships with local institutions and organizations provide resources to the program in the form of AmeriCorps members, student service learners, and other programmatic support. Applied research and evaluation efforts indicate that Adventure Central has been very successful in creating a high quality, positive youth development environment, and that youth and their families have developed a greater connection with nature.

Program Needs

The needs assessment process included gathering national program examples; talking with staff from both partner agencies (Ohio State Extension and Five Rivers MetroParks); collecting local demographics, existing data, and reports; and conducting focus groups and interviews with key stakeholders in the community (e.g. residents, community leaders, and local government officials). Data were collected locally in 1998 from over 40 representatives from the community, social service agencies, and youth-serving agencies, with a focus on understanding what neighborhood children needed most. Representatives consistently indicated that positive afterschool and summer opportunities were insufficient to meet the needs of urban youth, that youth in the target neighborhoods were underserved, and that youth developmental needs were not being met (e.g., for developing selfesteem and having positive role models) (Modic & McNeely, 1998).

The team concluded that a program providing hands-on environmental education experiences, and sustained contact with nature, other children, and positive adult role models would fill an unmet need in the community. This approach would also capitalize on the strengths of both partners, and meet their organizational needs to achieve high levels of engagement with an underserved audience. The products that resulted from the community needs assessment and data collection process included a mission statement, goals, and a program plan. Afterschool and summer day camp programs were initiated as the primary programmatic thrust in 2000-2001. Plans are reviewed annually to determine continued program focus and direction.



Targeted Audience

The population of the West Dayton community is 94% African-American with a median annual income of just over \$22,000. Over 34% of residents live below the poverty line. In 2010, Adventure Central engaged over 210 urban Dayton youth ages 5 to 18, and over 90 parents/guardians in programming totaling over 57,000 contact hours. Ninety-nine percent of program participants identified themselves as African-American, and 80% qualified for free or reduced-price meals. Ninety percent of participants were in the 1st through 7th grades.

Program Goals and Objectives

1. Youth and their families will have opportunities for positive development.

Process Objectives

- Programming will be high duration, high frequency and high intensity as measured by participation numbers, contact hours, and program calendar.
- Youth and parents will report that program learning activities are fun and engaging with a focus on nature, science, literacy, healthy lifestyles and computer technology.
- Youth will report that a variety of service-learning, volunteer and programmatic opportunities are offered to teens and adults.
- Youth will report positive relationships with program adults.

Outcome Objectives

- Parents will report that their children have made gains socially and academically through program participation.
- Youth will report they gained life skills through program participation as reported by older youth through focus groups.
- 2. Youth and their families will develop a greater connection to nature.

Outcome Objective

• Youth and their families will report improved attitudes towards their connection with nature because of program participation.

Program Design/Curricula and Materials

The Adventure Central program plan is developed annually, and serves as a curriculum to guide the program for the upcoming academic year. The program plan includes monthly themes, objectives, tactics, and recommended curricula, as well as resources for specific topics. From the program plan, the group leaders develop lesson plans for each day and week, with approval of program leadership prior to implementation (see <u>Adventure Central Program Plan A</u> and <u>Program Plan B</u> for examples). Facilitator-directed curriculum from 4-H such as Acres of Adventures, Go Plants, and Jr. Master Gardener®, or other hands-on, experiential groups such as Project's WET, WILD and Learning Tree are the primary sources for the program. Most activities come from one of

these research-based curricula, and all activities adhere to the 4-H philosophy of hands on "learning by doing." Sections for parent engagement special events, service learning and staff development efforts are included as part of the program plan and integrated into the afterschool plans. Episodic, teen, and college service learners make up a large contingent of the Adventure Central volunteer corps. Because of this, a *How-to Guide for Supporting Episodic Volunteers* was created to help organize and support similar efforts at Adventure Central. The guide as well as the aforementioned program plan can be accessed at: <u>http://www.metroparks.org/Parks/Wes-leyanAdventure/AC_pubs.aspx</u>.

Knowledge and Research Base

Adventure Central preprogramming is guided by a framework that incorporates the features of positive developmental settings (Eccles & Gootman, 2002; National 4-H Impact Assessment, 2001); essential elements (Kress, 2006); and the six Cs – competence, confidence, character, caring, connection and contribution (Lerner, 2006; Lerner et al., 2005). Adventure Central integrates high touch with opportunities to connect with nature. The result: Participants gain strengthened values, lasting life skills, and both an eagerness and confidence to explore life's possibilities and the natural world. Furthermore, Adventure Central serves as a demonstration plot, a model of outreach for the twenty-first century land-grant institution (Cochran, Arnett, & Ferrari, 2007).

Youth enrolled in Adventure Central are expected to maintain consistent attendance (four days a week throughout the school year and summer). This intentional focus on high-contact programming is supported by the current body of research, which indicates that youth obtain developmental benefits from consistent participation in well-run, quality youth programs (e.g., Durlak & Weissberg, 2007; Little & Harris, 2003; Hansen & Larson, 2007; Little, Wimer, & Weiss, 2008; Scott-Little, Hamann, & Jurs, 2002; Vandell et al., 2006). Through such programs, youth are able to meet needs for belonging, connection, independence, and mastery (Eccles & Gootman, 2002; Kress, 2006).

Parent and family engagement is another intentional hallmark of the Adventure Central afterschool program, based on the belief that parents are the primary influence in a child's life. Research-based recommendations suggest that parental involvement is key to children's academic achievement and overall healthy development (Epstein, 1991; Fan & Chen, 2001; Gettinger & Guetschow, 1998; Hara & Burke, 1998; Jeynes, 2005), Adventure Central has dedicated a full-time staff position to building and maintaining ongoing relationships with participants' parents and families. This is done through both informal contact (opportunities to share information or provide feedback on youth behavior), and through formal programming (family fun nights, parent orientations, and parent education classes).

Adventure Central provides youth with both structured and unstructured opportunities to connect with nature, in an effort to reduce the occurrence and prevalence of nature deficit disorder, a condition produced by insufficient time in the outdoors and resulting in a wide range of behavior problems (Louv, 2005). Youth engage with nature through learner-directed inquiry activities and spend at least one hour each day in free play in a safe, accessible natural area. These experiences strongly influence childhood development, and offer children irreplace-able opportunities for exploring and discovering, for creating and developing their personalities and identities, and for probing and testing the margins of their world (Chawla, 2007; Kellert, 2005).

Finally, Adventure Central represents a model for outreach for the 21st century land-grant institution. In the words of the 2000 Kellogg Commission on the Future of State and Land-Grant Universities, it is a "conscious ef-





fort to bring the resources and expertise at our institutions to bear on the community" (p. 10). The partnership created between field staff and campus-based extension support keeps the program grounded in the community through the day-to-day conduct of educational programming, while also approaching the work in a scholarly manner. Now in its tenth year of operation, the practical needs of the program have driven the applied research agenda in which the scholarship leads to use of best practices and contributions to the knowledge base. While individual elements contribute to its success, Adventure Central derives its strength from the comprehensive nature of the program. Furthermore, this model of engagement can be replicated (Cochran et al., 2007).

Partners

Adventure Central is a complex and dynamic partnership between The Ohio State University Extension, 4-H, and Five Rivers MetroParks. These organizations provide the facility, operating budget, and base personnel to conduct the Adventure Central program. State program specialists through OSU Extension have also been utilized in program design and evaluation.

A partnership with Notre Dame Mission Volunteers AmeriCorps has led to three full-time staff members on 11-month terms. The University of Dayton has been a tremendous local partner with collaborations leading to over 260 service learners, who have contributed 12,700 service hours since 2003 many of which we science students through courses or service groups, one to two Semester of Service AmeriCorps members providing full-time service each semester, as well as an Ohio Campus Compact AmeriCorps VISTA that was co-housed between the University of Dayton and Adventure Central for five years and charged with conducting an afterschool program at Fairview Elementary.

Adventure Central also works with the Ohio Department of Education to provide meals to youth in the program, and with local partners like Montgomery County Public Health, Five Rivers MetroParks Ranger Division, and the Montgomery County Expanded Food and Nutrition Education Program (EFNEP) for educational health and safety programs.

Funding

This positive youth development initiative, focused on science, nature, and healthy lifestyles was made possible through funding from Five Rivers MetroParks, OSU Extension, Ohio 4-H Foundation, University of Dayton, Ohio Department of Education and other grants and contracts. The annual operating budget is roughly \$700,000 inclusive of operating the program, facility, and staffing.

Staffing

The program team includes 11 staff from OSU Extension (2 educators, 3 program assistants), Five Rivers MetroParks (administrative assistant, 2 apprentices), Notre Dame Mission Volunteers AmeriCorps (3), and the University of Dayton Semester of Service AmeriCorps (1-2). Additionally up to eight teens are hired during the summer as part of the JET program, with up to another 16 teens filling volunteer roles with the program. Four park and maintenance personnel complete the staff.

Program Delivery

Adventure Central's program utilizes a variety of delivery methods to achieve its goals to include youth-selected activities, leader-directed activities, and parent/family engagement. All program efforts attempt to utilize the

outdoor environment in the 60-acre Wesleyan MetroPark where Adventure Central is housed, in order to enhance learning with a goal of youth being outside at least one hour each day. Parents are engaged informally, but intentionally, as special activities are planned at least quarterly at the facility or at a partner site to continue to build relationships and support between program staff and parents.

Afterschool Program. The afterschool program operates from September through May with programming offered Monday-Thursday from 1:30 p.m. to 6:30 p.m. Youth voice and choice is a priority of the program, and to this end, each day from 1:30 to 4:30 p.m. youth have a choice about the activities they wish to participate in, to include homework assistance, outdoor play and games, computer lab, or indoor games and activities. At 4:30 p.m., youth are divided into five groups by developmental age (younger to older) and eat a meal together. From 5:00-6:30 p.m. youth work in their groups through structured leader-directed learning activities according to the monthly theme, objectives, and tactics. An annual science fair is held as part of a monthly theme during the afterschool program.

Day Camp. The Day Camp operates June and July with programming offered Monday-Thursday from 7:30 a.m. to 5:00 p.m. Structured, leader-directed activities occur from 10:00 a.m. until 2:30 p.m. and include activities around weekly themes, utilizing the park, and include field trips to other Five Rivers MetroParks facilities or local learning destinations. A program goal is to have youth spend at least ½ of their time outside daily.

Job Experience and Training (JET) Program. The JET Program spans February to August with the focus on developing 21st century skills in teens through parks-related careers and providing a service to the public. Annual participation ranges between 20-25 teens. Teens deliver 30 hours of service weekly over an eight week period, some in paid positions and others as volunteers at one of six Five Rivers MetroParks facilities.

Recognition of Participants

Teens in the JET program receive compensation or a gift card as recognition following the completion of their service. Youth participating in the science fair are recognized for their efforts at a showcase event at the end of the experience to include judging and oral presentation. Youth are also recognized for their efforts in the bi-monthly newsletter. Special programs have also been implemented over periods of time where youth are recognized as "AC Achievers" by and in front of their peers for being positive examples of the program expectations. Individual certificates have also been presented annually for each program participant, in recognition of one outstanding trait or aspect of that individual. Youth are encouraged to bring in certificates, trophies, report cards, honor roll letters, and so forth, so they can be recognized by staff.

Program Evaluation and Outcomes/Impact

Adventure Central has conducted multiple evaluations over the initial 10 years of programming with two that are particularly relevant. Evaluation of parental perceptions of family involvement and youth outcomes for Adventure Central programs (Ferrari et al., 2006) includes the following:

- 1. A survey completed by parents that includes questions on educational support practices, barriers to participation, parents interest in education and family focused activities, climate and support from Adventure Central, and perception of youth outcomes.
- 2. Focus groups with parents conducted with questions designed to elicit parents' thoughts regarding their own




and their child's experience at Adventure Central, and their suggestions regarding future family programming.

Evaluation of youth outcomes of long-term participation in Adventure Central programs (Ferrari, Lekies, & Arnett, 2009) included focus groups with participants aged 12-16 who participated three or more years to learn about the outcomes of long-term participation. Questions addressed how teens' participation had helped them, attitudes and skills they acquired, opportunities afforded to them, and their insight into program features that captured their interest and engaged them in sustained participation.

Process Evaluation

In a study on long-term participation, youth provided feedback on the types of opportunities they felt had the greatest impact on their continued participation in programming, as well as their growth and development. Implementation of features shared by youth included sustained and enhanced opportunities for older youth to provide service, participate in work-based learning, and take on increasing levels of responsibility for programming, specifically with the overnight camp experience. Youth also indicated that existing programming philosophy was reaching the desired outcomes, especially in regards to youth connecting with nature. Therefore, the program took action to make sure to build from the efforts underway for stability and consistency while seeking new enhancements to add value to the core program.

Great attention has been spent by program staff to continually assess the environmental factors related to successful afterschool outcomes and make adjustments as appropriate. The long-term participation study, as well as previous research at Adventure Central has documented the existence of positive youth-staff relationships (Paisley & Ferrari, 2005), a sense of belonging (Ferrari et al., 2006; Ferrari & Turner, 2006), and mastery of skills (Ferrari, Arnett, & Cochran, 2008), demonstrating that the essential elements are present to facilitate learning and development.

Outcome Evaluation

In a long-term participation study it was found that youth participants of three or more years in the Adventure Central afterschool program experienced a wide range of opportunities throughout their years of participation. They spoke positively of their experiences, of the ways they had grown personally, and of their relationships with peers and staff. They learned new skills that helped them as they were growing up, and also recognized the ways in which participation could benefit them in the future. Youth felt these skills were helping them in other settings, and they were able to articulate how skills learned at Adventure Central had helped them at home and school. The youth in this study were able to articulate clearly not only how they benefited from their participation, but also what specific program aspects were meaningful to them. The study shows that Adventure Central has affected participants' lives in positive ways, such as having new opportunities they wouldn't have had otherwise (Ferrari et al., 2009).

Through long-term participation, youth reported changing attitudes about nature, in particular being more comfortable in nature and having greater respect for trees and habitat. They attributed these changes to the regular and direct experience with nature through the program, their work and volunteer experiences, having fun outside, and overcoming their fears about the natural world (Ferrari et al., 2009).

As part of an evaluation of parental perceptions of family involvement and youth outcomes, the vast majority

of parents (*n*=64) indicated that their child experienced a variety of educational and social benefits due to their participation in the program. More than two-thirds agreed or strongly agreed that their child improved since coming to Adventure Central. Improvements in social skills and school performance were mentioned most often (Ferrari et al., 2006).

Evidence of Sustainability

The Adventure Central afterschool program is one of the core programs operated by Adventure Central and was the primary reason for the program's creation. The partnership began with a 10-year agreement in 1998 between Five Rivers MetroParks, Ohio State University Extension and 4-H, which was enthusiastically renewed in 2007 through 2016, thus providing base operating funds for that timeframe. The program has consistently brought in \$100,000 or more annually from external funds over the past 10 years. Program staff has grown from five staff originally to 13 team members currently. Annually, over 120 volunteers contribute at least 12,000 hours of service to Adventure Central.

Awards or other Recognition Received for Program

Overall Recognition

- National Association of Extension 4-H Agents (NAE4HA) Susan Barkman Scholarship for Research Awarded to Theresa Ferrari, Kristi Lekies and Nate Arnett in 2007 for their research proposal regarding outcomes of long-term participation.
- Adventure Central added to the Harvard Family Research Project's Out-of-School Time Evaluation Database. The database contains profiles of programs and their evaluation results. The Adventure Central profile may be obtained from the Harvard Family Research Project's website: <u>http://www.hfrp.org/out-of-school-time/ ost-database-bibliography/database/adventure-central</u>.
- Adventure Central was selected to appear in the National Association of Extension 4-H Agents' Directory of Urban Programs. The profile is found at the following website under the "Personal Development" category: <u>http://www.colorado4h.org/urbanprogram/</u>.

Adventure Central Afterschool Program

National 4-H Program of Distinction – Description available at: <u>http://www.nifa.usda.gov/nea/family/res/</u> pdfs/4_h_database/Adventure_Central_2011.pdf

Job Experience and Training National Awards

- National 4-H Program of Distinction Description available at: <u>http://www.nifa.usda.gov/nea/family/res/</u> pdfs/4_h_database/JETO9.pdf
- Dr. Duncan Program of Distinction Award for North Central Region NAE4HA
- METLife Excellence in 4-H Afterschool Award for 4-H Programs of Distinction Adventure Central's JET





Considerations for Replication

While Adventure Central is a complex partnership that derives its strength from being facility based and managed, many aspects of the program have been replicated, and guides and plans were developed to aid others in replication efforts.

Since 2006, components of the Adventure Central afterschool program have been replicated as part of an outreach program at Fairview Elementary School. Fairview Elementary is a Dayton Public School Neighborhood School Center, and Adventure Central was sought out as a local partner to provide afterschool services by both the University of Dayton, who is guiding the community process, and the school administration. The program was led by a Campus Compact AmeriCorps VISTA under the training and direction of Adventure Central professionals.

Adventure Central was created as a model program and has had a number of professionals from other countries (Taiwan, Ireland, Armenia, Georgia, and Uzbekistan) and states (West Virginia and Indiana) visit to observe and learn about the methods and process utilized at Adventure Central. The curriculum was also used for teaching 62 4-H professionals and afterschool community partners who attended a statewide in-service training in spring 2005. Programs initiated from this training are still being implemented today.

Adventure Central has been recognized as a leader in helping to reconnect youth and nature. Through the afterschool program youth have daily high quality experiences with the natural world and this model is gaining attention. Nate Arnett, Director, was one of 30 professionals selected in 2009 by National 4-H to participate in a think tank on reconnecting youth and nature. Collaborations with Dayton Public School Neighborhood School Centers have led to improved environments on the school grounds and better utilization of their grounds for instruction and exploration.

The Adventure Central Program Plan and How-to Guide for Supporting Episodic Volunteers are two examples of resources that are written with practical application and program replication in mind.

References

- Chawla, L. (2007). Childhood experiences associated with care for the natural world: A theoretical framework for empirical results. *Children, Youth and Environments*, 17(4), pp. 144 170.
- Cochran, G., Arnett, N., & Ferrari, T. M. (2007). Adventure Central: Applying the "demonstration plot" concept to youth development. *Journal of Higher Education Outreach and Engagement*, 11(4), pp. 55-75. Retrieved from: <u>http://openjournals.libs.uga.edu/index.php/jheoe/article/view/142</u>
- Durlak, J. A., & Weissberg, R. P. (2007). The impact of after-school programs that promote personal and social skills. Retrieved from <u>http://www.casel.org/downloads/ASP-Full.pdf</u>
- Eccles, J., & Gootman, J.A. (Eds.). (2002). *Community programs to promote youth development*. Washington, DC: National Academy Press.
- Epstein, J. (1991). Effects on student achievement of teacher practices of parent involvement. In S. Silverman (Ed.) Advances in reading/language research, Vol. 5, Literacy through family, community, and school interaction, Greenwich, CT: JAI Press.

- Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, 13(1), 1-22.
- Ferrari, T. M., Arnett, N. E., & Cochran, G. R. (2008). Preparing teens for success: Building 21st century skills through a 4-H work-based learning program. *Journal of Youth Development*, 3(1), Article 080301FA001. Retrieved from: <u>http://data.memberclicks.com/site/nae4a/JYD_080301final.pdf</u>
- Ferrari, T. M., Futris, T. G., Smathers, C. A., Cochran, G. R., Arnett, N., & Digby, J. K. (2006). Parents' perceptions of family involvement and youth outcomes at an urban 4-H program. *Forum for Family and Consumer Issues*, 11(2) Retrieved from: <u>http://www.ces.ncsu.edu/depts/fcs/pub/11_2/fa1.html</u>
- Ferrari, T. M., Lekies, K. S., & Arnett, N. E. (2009). Opportunities matter: Exploring youth's perspectives on their long-term participation in an urban 4-H youth development program. Journal of Youth Development, 4(3), Article 090403FA001. Retrieved from: <u>http://data.memberclicks.com/site/nae4a/JYD_090403final.pdf</u>
- Ferrari, T. M., & Turner, C. L. (2006). Motivations for joining and continued participation in a 4-H Afterschool program. Journal of Extension, 44(4), Article No. 4RIB3. <u>*Retrieved from: http://www.joe.org/joe/2006august/ rb3.shtml*</u>
- Gettinger, M., & Guetschow, K. (1998). Parental involvement in schools: Parent and teacher perceptions of roles, efficacy, and opportunities. *Journal of Research and Development in Education*, 32(1), 38-52.
- Hansen, D., & Larson, R. W. (2007). Amplifiers of developmental and negative experiences in organized activities: Dosage, motivation, lead roles, and adult-youth ratios. *Journal of Applied Developmental Psychology*, 28, 360-374.
- Hara, S. R., & Burke. D. J. (1998). Parent involvement: The key to improved student achievement. *School Community Journal*, 8(2), 9-19.
- Jeynes, W. H. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*, 40(3), 237-269.
- Kellert, S. R. (2005). Nature and childhood development. In *Building for life: Designing and understanding the human-nature connection*. Washington, DC: Island Press.
- Kellogg Commission on the Future State and Land-Grant Universities. (2000). *Renewing the covenant: Learning, discovery, and engagement in a new age and a different world*. Washington, DC: National Association of State Universities and Land-Grant Colleges.
- Kress, C. A. (2006). Twenty-first century learning after school: The case of 4-H. *New Directions for Youth Development,* 110, 133-140.
- Lerner, R. M. (2006, October). The study of positive youth development: Implications of developmental change across grades 5, 6, and 7. General session presented at the National Association of Extension 4-H Agents, Milwaukee, WI.





- Lerner, R. M., Lerner, J. V., Almerigi, J. B., Theokas, C., Phelps, E., Gestsdottir, S., et al. (2005). Positive youth development, participation in community youth development programs, and community contributions of fifth-grade adolescents: Findings from the first wave of the 4-H Study of Positive Youth Development. *Journal of Early Adolescence*, 25(1), 17-55.
- Little, P. M. D., & Harris, E. (2003). A review of out-of-school time program quasi-experimental and experimental evaluation results [Out-of-School Time Evaluation Snapshot #1]. Retrieved from the Harvard Family Research Project Web site: <u>http://www.hfrp.org/publications-resources/browse-our-publications/a-review-of-out-of-school-time-program-quasi-experimental-and-experimental-evaluation-results</u>
- Little, P. M. D., Wimer, C., & Weiss, H. B. (2008). *After-school programs in the 21st century: Their potential and what it takes to achieve it* [Issue Brief #10]. Retrieved from the Harvard Family Research Project Web site: <u>http://www.hfrp.org/publications-resources/browse-our-publications/after-school-programs-in-the-21stcentury-their-potential-and-what-it-takes-to-achieve-it</u>
- Louv, R. (2005). *Last child in the woods: Saving our children from nature deficit disorder.* Chapel Hill, NC: Algonquin Books of Chapel Hill.
- Modic, L., & McNeely, N. N. (1998). Wesleyan facility needs assessment. Dayton: Five Rivers MetroParks.
- Paisley, J. E., & Ferrari, T. M. (2005). Extent of positive youth-adult relationships in a 4-H Afterschool program. *Journal of Extension*, 43(2), Article 2RIB4. Retrieved from: <u>http://www.joe.org/joe/2005april/rb4.shtml</u>
- National 4-H Impact Assessment. (2001). *Prepared and engaged youth*. Retrieved from the National 4-H Headquarters website: <u>http://www.national4-hheadquarters.gov/about/4h_impact.htm</u>
- Scott-Little, C., Hamann, M.S., & Jurs, S.G. (2002). Evaluations of after-school programs: A meta-evaluation of methodologies and narrative synthesis of findings. *American Journal of Evaluation*, 23(4), 387-419.
- Vandell, D. L., Reisner, E. R., Pierce, K. M., Brown, B. B., Lee, D., Bolt, D., & Pechman, E. M. (2006, August). The study of promising after-school programs: Examination of longer term outcomes after two years of program experiences. Retrieved from the University of California-Irvine Web site: <u>http://www.gse.uci.edu/childcare/ pdf/afterschool/PP%20Examination%20in%20Year%203.pdf</u>

In Partnership With







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Union County 4-H Summer Science Program

Abstract

The Union County 4-H Summer Science Program of Rutgers Cooperative Extension, New Jersey, seeks to develop interest in science and science careers in low-income, elementary school youth. (In Union County, NJ, the majority of low income children live in the urban parts of the county.) Since 1992, for seven weeks each summer, 4-H science teachers travel from the 4-H Center to independently run day camps in low-income areas of Union County. There, they share science activities with the children. Activities emphasize experiential learning about the process of science. Recent lessons have been taken from the *Design It!* and *Acres of Agriculture* curricula. The day camps welcome the science program because of its high quality and affordability (\$60 for seven weeks of activities). To maintain the high quality, 4-H hires certified teachers to facilitate the lessons. Science professionals (lab technicians, researchers, and chemists) also visit the camps to talk about and demonstrate their careers with the children. (The majority of children have never met a science professional in person.) Program evaluations show an increase in students' interest in science as a field of study and also as a career. Approximately 600 youth participated in the program in 2010. The program has been funded since 1993 by a pharmaceutical corporation located in Union County. Approximate cost each year is \$11,000. (\$10, 000 comes from the corporate sponsor and \$1,000 from the day camps.)

Program Needs

Union County, New Jersey, is an urban/suburban county of 496,000 people. While much of the county is of middle to upper income background, large pockets of poverty remain. In the City of Plainfield 16% of the residents (7,500 people) live below the poverty level; in Rahway 7% (2,000 people), and in Elizabeth 17% (21,000 people) (Information Publications, 2009). In these populations, science test scores are extremely deficient. The percentage of youth passing the 4th grade *New Jersey Science Proficiency Test* in Elizabeth, Plainfield and Rahway is 36%, 58% and 47%, respectively (*The Star Ledger*, "2008 School Report Card"). These scores are in comparison to a district less than 8 miles from each, where 97% of the students pass the test.

This poor performance in science has severe consequences. It excludes students from career opportunities in the science field. According to the Bureau of Labor Statistics, the average salary for a physical scientist is \$80,000 per year. This is almost four times what many restaurant and service workers earn. Even a lower level science job, such as a science technician, pays well at an average salary of \$29,000 per year (United States Department of Labor, 2004-5). Union County offers many science related jobs. The Merck Pharmaceutical Company employs over 7,000 workers. The county also has many smaller firms that require knowledge of science.

Targeted Audience

The program targets low-income youth in grades 1 through 6 residing in New Jersey's Union County communities of Plainfield, Elizabeth and Rahway. These communities were chosen because of their high poverty rates (16%, 17% and 7% respectively), free school lunch figures, and students' low achievement on standardized test scores.



Program Goals and Objectives

Goal: To increase interest in science and science careers for low-income students.

Objectives

- Enroll 500 students in the 4-H Summer Science Program; 300 of whom will be from low income backgrounds.
- 50% of the students will be able to report that they can solve a problem better as a result of the 4-H Summer Science Program.
- 50% of the students will be able to report that they can observe things better as a result of the 4-H Summer Science Program.
- 50% of the students will be able to report that they can do an experiment as a result of the 4-H Summer Science Program.
- 50% of the students will be inspired to say they like science more as a result of the 4-H Summer Science Program.
- 50% of the students will consider that they would like to learn more about science as a result of the 4-H Summer Science Program.
- 50% of the students will want to tell someone about what they learned in the 4-H Summer Science Program.
- 25% of the students will think about becoming a scientist someday because of what they experienced in the 4-H Summer Science Program.
- 50% of the students will meet at least one scientist in person.

Program Design/Curricula and Materials

The 4-H science program offered at the day camps complement the other activities, such as arts and crafts and recreation. 4-H does not duplicate existing programs, and a different science theme is presented each year. Some past themes have been the human body, aeronautics, robotics, kitchen chemistry, and physics with toys.

Since the inception of this program in 1992, the Summer Science Program has presented varied curricula. The *4-H S.E.R.I.E.S.* curriculum was used for the first 10 years. It was created in 1988 by the University of California. Since then, we have used other curricula such as *Teaching Physics with Toys–Activities for Grades K to 9*, by Taylor, Poth and Portman; and *Fender Bender Physics* by Bevin and Raudebaugh. Most recently, the program utilized the *Acres of Agriculture* curriculum from the National 4-H Cooperative Curriculum System, and *Design It!* from the EDC Center for Science Education.

When the program first started in 1992, the camps were involved in the program schedule. We met as a team to plan a schedule that worked for everyone. Since that time, we have followed the original schedule and added groups into any vacant spots. So far, we have not requested the sites to be involved in the curriculum. However, they seem to be pleased with what we select, including the camps that have been with the program since its inception.

Knowledge and Research Base

The 4-H Summer Science Program is unique in many ways. First, it is a 4-H program that is *not* volunteer or club based. Due to the intensive nature of the program (40-hours per week, seven-weeks), it was decided that using paid employees would work best; a finding corroborated by the Union County Family and Community Health Sciences Educator. Secondly, this program was the first of its kind in Union County to bring science lessons to day camps located in the low-income parts of the county. Although science is studied in the county's elementary schools, it had rarely been offered at a professional level through the low-income summer day camps. Lastly, this program was implemented with several groups that had not previously collaborated with 4-H.

The Union County 4-H Summer Science Program is partially based on the 4-H S.E.R.I.E.S. program as developed by Dr. Richard Ponzio in 1989. S.E.R.I.E.S. stands for Science Experience and Resources for Informal Education Settings. It was developed with support from the National Science Foundation. According to personal correspondence with the principal author of the curriculum, S.E.R.I.E.S. has been used throughout the United States (R. Ponzio, Jan. 2006). It is also being used in Africa and several Latin American countries.

S.E.R.I.E.S. is effective because it is experiential in nature. Quoting from *S.E.R.I.E.S.* materials, "The instructional model used in presenting the inquiry based activities is an adaptation of Karplus' Learning Cycle." The learning cycle consists of the following steps: Exploration, Concept Introduction, and Concept Application. In the Exploration phase, again quoting from the *S.E.R.I.E.S.* curriculum, "The youth learn through their own actions and reactions with minimal guidance or expectation of specific accomplishments." In the Concept Introduction phase they "begin with the introduction of a concept or principle related to the activity or unit." The last phase is the Application phase. Activities in this phase provide "relevance and connection between what is being learned in the world by focusing on high intrinsic interest topics chosen by the participants themselves."

The effectiveness of programs such as *S.E.R.I.E.S.* was evaluated by the National Science Foundation in 1998. In its report, *A Report on the Evaluation of the National Science Foundation's Informal Science Education Program*, there is a broad overview of the effectiveness of programs such as *S.E.R.I.E.S.* More specifically, Exhibits 8, 9 and 10 of the study document how a significant number of current scientists became interested in science because of exposure to it through programs such as *S.E.R.I.E.S.* (National Science Foundation, 1998). The 4-H Summer Science Program initially used the *S.E.R.I.E.S.* materials. Recently, we have used curricula from the National Science Teachers Association, 4-H Cooperative Curriculum System and School Age Notes. This change came about because the materials and supplies needed for *S.E.R.I.E.S.* were no longer available.

Partners

The program is supported by non-profit groups that host the day camp sites. In Plainfield our partners are: The King's Daughters Day School, The Plainfield YMCA, The Neighborhood House, The Black United Fund, and the United Church of Christ Summer Day Camp. In Rahway our partners are the JFK Community Center and the Rahway Recreation Department. In Elizabeth we work with The Union County Coalition to House the Homeless and The YMCA of Elizabeth.

The non-profits mentioned above provide sites for our program to work with the children. The camps also provide an environment that attracts children; arts and crafts, recreation, meals, and all day supervision. A one period stand-alone science program would not attract children who need all day childcare. The





centers also provide funds for the science materials.

Just as much as 4-H needs the centers, they also need 4-H. They do not have sufficient funds to hire workers to teach science lessons to the children. Without the 4-H teachers, they would have to eliminate science from their curricula.

The funder for our program is the Merck/Schering–Plough Corporation. This company also supplies science role models, which means their chemists, biologists, and other science workers visit the day camp sites. During their visits with the children, they describe their work, carry out a hands-on activity that relates to their work, and discuss the training their job requires.

Funding

- Merck Corporation \$9,800 support in 2010.
- Camps in Union County, NJ contributed about \$1,000 in 2010.
- Rutgers Cooperative Extension 4-H Program of Union County invested 50 hours of salary for one 4-H Agent.

Staffing

The Union County 4-H Agent contributes approximately 50 hours to organizing and preparing the program prior to the summer. Time is spent soliciting sites for the program, organizing the schedule for the program, interview-ing/hiring the teachers, and planning the summer's activities.

Two seasonal employees, both of whom are experienced certified teachers, are employed for seven weeks in July and August. During that time, they travel from day camp to day camp, providing science instruction and activities for the children.

Program Delivery

The instructors provide the children with seven 45-minute sessions of science instruction over a seven-week period, or one visit each week for 7 weeks. The children are summer day camp participants. The camps are run by various non-profit groups (e.g. YMCA) in the low-income neighborhoods of Union County. Rather than requiring the sites to transport the children to the Union County 4-H Center, the 4-H instructors travel to each of the day camp sites.

Program staff work with small groups at the day camps of no more than 10 children at a time. The smaller groups allow facilitators to proceed more rapidly than similar lessons in larger classroom settings. Thus, students begin to understand that science is action-oriented, rather than tedious and slow-moving.

In addition to the standard group sessions, scientists and science workers are introduced to the children. The scientists offer a hands-on activity that reflects their occupation. Chemists demonstrate a variety of chemical reactions. Biologists demonstrate mock programs about how a compound becomes a pharmaceutical, and microbiologists show the children how scientists look at cells. These activities are successful because they are age appropriate, hands-on, and reflect what the scientists actually do in their full-time positions.

Recognition of Participants

Each day camp receives a framed "Certificate of Participation" signed by Rutgers Cooperative Extension and Merck staff. The recipients highly value the certificate. I have seen them posted on the walls of many of the day camps. Recognition of individual youth has varied from year to year. Some years we gave away plastic cups with 4-H Summer Science Program written on them. Other years we gave pencils or raffled off science equipment as door prizes for the youth.

The program has also received significant press coverage. The program's corporate sponsor schedules a center visit with one of their scientists, and informs media contacts about the visit. When a scientist visits the site, usually one or two reporters and photographers are there as well. Sometimes, government officials visit the sites with the scientists. The officials are also accompanied by photographers or reporters. Recently, an official presented the corporate sponsors with certificates of appreciation.

Program Evaluation and Outcomes/Impact

Our most recent program evaluation was done in August 2010. The results of this end-of-program survey of the children included:

- 90% said they can solve a problem better now. •
- 86% said they can observe things better.
- 87% said they can do an experiment.
- 78% said they would like to learn more about science.
- 73% said they would tell someone what they learned.
- 42% said they would like to become a scientist someday.
- 78% said they like science more than before.

Quotes from participants in the program point to other gains. "This is something I could do for my school science project", said one child. Other children said that the program expanded their horizons, "I can do an experiment; I can be my family's scientist" or "I can do something new."

Camp directors were asked what they thought the"... campers liked best about the science program?" Replies included:

- The interactive experiments and the diversity in each presentation.
- New teacher, hands-on activities, allowed campers to be creative & work as a team.
- The hands-on activities, they enjoyed experimenting in new fun ways.
- The campers enjoyed learning about science through hands-on activities.
- The hands-on and interactive activities.
- The campers enjoyed the hands-on nature of the program and had fun with the activities.
- They enjoyed the hands-on activities and experiments.

The directors were also asked, "What did you like best about the Summer Science Program?" Responses included:

• It helps our youth understand that science can be interesting, exciting, and useful in their daily lives.





- All new activities, kids were engaged and they weren't bored. (*some new activities for the DASH After School Program)
- Seeing their progress. Since many of the activities we have done in previous years, seeing the kids apply what they learned last time was exciting.
- The program encouraged the children to be creative. The campers really enjoyed the glider activity.
- The staff were great and the activities were engaging.
- I liked that the program kept the children engaged and that they were genuinely interested in the projects. I liked that the children had fun and also that the project was mostly left up to the students to do, with minimal intervention from the instructor.
- The instructor was engaging and assisted the students in the various experiments.

Additional comments from camp directors included:

- I support this program because of the value it brings to encouraging our students to take a different view of science. I hope that each year this program is made available to all camps.
- Our school summer program has participated in the 4-H Summer [Science] Program for the last several years. We have always [had] fun.

Evidence of Sustainability

When the 4-H Summer Science Program started, it was initially funded by a private foundation known as the Janet Memorial Fund. When I learned that they could not fund the program after the first year, I approached the Schering-Plough Corporation. (In 2010 they became Merck Corporation.) They have been our funder for the last 16 years. I believe they have funded the program so faithfully because it reaches an audience that they are deeply committed to helping.

If Merck could no longer fund the program, I believe other funding streams could be found. If sufficient funds could not be found to carry on the program as it currently exists, I would adopt a 'Train-the-Trainer' model. Using this model, we would train summer camp staff to carry on the program in place of paid teachers.

Awards or Other Recognition Received for Program

USDA Program of Distinction, 2006. This award is presented to programs that have demonstrated significant and documentable success.

Urban Programming Award, National Association of Extension 4-H Agents (NAE4HA) for Union County 4-H Traveling Science Program, October 2007. Program was chosen as a successful urban program and entered into NAE4HA Directory of Successful Urban 4-H Programs.

Urban Program Showcase, NAE4HA 2008, one of four featured programs that were presented at 2008 NAE4-HA National Conference.





4-H Youth Development Programs of Excellence, United States Department of Agriculture, in acknowledgement of Union County 4-H Summer Science Program. Science Program was chosen along with 48 others from a pool of 141 applicants, February 2000.

Considerations for Replication

This program takes about 50 hours to organize in the winter/spring of the year. It may take up to 100 hours the first year. More time is spent in the beginning making contacts with funders and day camps to host the program. The Union County 4-H Agent [*nichnadowicz@njaes.rutgers.edu*] is available to assist anyone interested in starting this program.

References

Information Publications, 2009, The New Jersey Municipal Data Book, Palo Alto, CA

- National Science Foundation, 1998. "A Report on the Evaluation of the National Science Foundation's Informal Science Education Program" retrieved from the website <u>http://www.nsf.gov/pubs/1998/nsf9865/nsf9865.htm</u>.
- Nichnadowicz, J., 2004. "The Union County 4-H Summer Science Program: An effective method for increasing low-income youth's interest in science." *Journal of Extension*. Retrieved from: <u>http://www.joe.org/joe/2004june/iw4.shtml</u>.

2008 NJ School Report Card, Star Ledger, (2008).

United States Department of Labor (2005) Occupational Outlook Handbook, 2004-5 (pp. 124-180) Indianapolis, IN.

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Youth Wetlands Education and Outreach Program

Abstract

Louisiana contains approximately 40% of the nation's coastal wetlands in the contiguous United States, but accounts for over 80% of the total national wetland loss. Continued wetland loss in Louisiana will result in severe ecological and economic ramifications for the entire nation. The need for individuals willing to make significant contributions to help control wetland loss and create sustainability of Louisiana wetlands is immense. The Youth Wetlands Education and Outreach Program is a statewide program consisting of environmental education lessons and hands-on activities, designed to heighten the awareness of Louisiana's youth to the unprecedented problem of wetland loss. Program materials, including structured lesson plans, supplies, and step-by-step procedures to activities, are provided for educators to implement throughout the academic year. During the summer months, students are encouraged to attend four summer camps associated with the program and participate in wetland restoration efforts. The program promotes awareness, ownership, and empowerment in youth by immersing students in a concentrated curriculum of wetland related environmental studies. The Youth Wetlands Education and Outreach Program provides youth with direct experience and increased knowledge of environmental action skills, to instill in students that they can make a meaningful contribution to preserving, conserving, and restoring Louisiana's wetlands.

Program Needs

The need for individuals willing to make significant contributions to help control wetland loss and create sustainability of Louisiana wetlands is immense. There are currently increased restoration efforts being made in Louisiana because of the recognized importance of wetlands; however, attempts at restoration and rehabilitation often prove difficult due to lack of knowledge about the ecosystem. The Youth Wetlands Education and Outreach Program provides science-based, hands-on activities for students to gain an understanding of the functions and values of wetlands and explore strategies for sustaining these unique ecosystems. Louisiana's wetlands serve as an excellent place for students of all ages to learn about wetland ecosystems.

The Youth Wetlands Education and Outreach Program is based on a pilot study by Karsh (2002) that indicated students who participated in horticulture lessons containing classroom curriculum and handson activities significantly improved their overall science scores, as compared to the students who did not participate. Like the lessons utilized in the study by Karsh (2002), the *Youth Wetlands Education and Outreach Program* curriculum is designed to follow Louisiana's Grade Level Expectations (GLE's). Because of this association to GLE's, pre- and post test scores reflect increased knowledge of main science concepts.

Increased post test scores associated with GLE's are significant because the United States is falling critically behind other nations in developing its future workforce of scientists, engineers, and technologists (4-H SET: A Strategic Framework for Progress, 2007). Scores from the National Assessment of Education Progress (NAEP) showed that Louisiana's average science scores in 4th and 8th grade were lower than those of the nation's public schools (NAEP, 2005). This is evidence that teaching and learning techniques for math and science in grades K-12 need to



be enhanced and improved by integrating interesting instruction. Better prepared teachers and more hands-on experiences, like those associated with the Youth Wetlands Education and Outreach Program, must be available to capture and hold the interest of the students (Thompson 1999).

Targeted Audience

The target audience of the program includes youth in grades 4-12 in urban, rural, and suburban communities. Parents, teachers, and community volunteers are also encouraged to participate in service activities and restoration projects.

Program Goals and Objectives

Program Goals

- 1. Instill into students the complexities and cons quences of continued unprecedented loss of wetlands on the citizenry of Louisiana;
- 2. Encourage students to act as ambassadors for wetland conservation and restoration and to share their views and knowledge with others in their community;
- 3. Motivate youth to become responsible environmental stewards by their participation in wetland related summer camp activities; and
- 4. Encourage teachers to promote student participation by utilizing science-based, hands-on lessons which bridge theory with practice.

Program Objectives

- 1. Develop environmental based lesson plans for grades 4-12 and provide schools with a teacher/student manual (including lessons and teaching materials) that can be readily used in a classroom setting;
- 2. Provide opportunities for service-learning activities that teachers can conduct during an intensive week dedicated to wetland learning, known as Youth Wetlands Week;
- 3. Provide field-based, hands-on experiences to youth during organized restoration projects held across the state and during participation in overnight camps, 4-H Camp Grant Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings; and
- 4. Conduct trainings and workshops that provide teachers with the skills to impact knowledge gained by students, while enhancing science proficiency.

Program Design/Curricula and Materials

Type of Program

The Youth Wetlands Education and Outreach Program is a state-wide program designed to heighten students' awareness of Louisiana's wetland loss through an organized educational program of outreach, empowerment, and advocacy. Although program materials are available year round, Youth Wetlands Week is an intensive week dedicated to in-classroom wetland learning held in the spring semester of the academic year. Throughout this week, educators teach the provided lesson plans in the curriculum manual and conduct service-learning activities in their community. During the summer months, students are encouraged to attend four summer camps associated with the program, 4-H Camp Grant Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings. Also, opportunities to participate in wetland restoration projects are available to students throughout the year in various locations across the state.

Curricula and Educational Materials

A major objective of the Youth Wetlands Education and Outreach program is to develop environmental based lesson plans for grades 4-12 and provide schools with a teacher/student manual (including lessons and teaching materials) that can be readily used in classroom setting. In addition to the lesson plan manual, packets sent to participating schools include resource materials, such as live plants, seeding trays, aerial photographs, laboratory supplies, markers, and field materials specific to conducting the grade appropriate hands-on wetland exercises.

Supplemental materials for the Youth Wetlands Education and Outreach Program:

- The Barataria-Terrebonne National Estuary Program (BTNEP) provides videos to be included in each grade-level packet. Examples of video titles are, Haunted Waters, Fragile Lands-Oh, What Tales to Tell!, Vanishing Wetlands, Vanishing Future, and Rescuing the Treasure.
- A video production entitled Wet Work, modeled after the successful Discovery Channels' Dirty Jobs, has been created specifically for the YW Program. Each video is approximately 15 minutes in length, is included in every grade level packet, and is posted on YouTube for public viewing.

Knowledge and Research Base

Louisiana contains approximately 40% of the nation's coastal wetlands in the contiguous United States, but the state accounts for over 80% of the total national wetland loss (Boesch, et al., 1994). Wetland deterioration is a significant environmental problem in coastal Louisiana, with current rates of loss averaging 24 square miles per year. The projected loss over the next 50 years, with current restoration efforts taken into account, is estimated to be approximately 500 square miles (Barras, et al., 2003). Along with the ecological significance of continued loss of coastal wetlands, there are numerous economic implications. It is estimated that over two million residents live and work in Louisiana's coastal parishes and the national economy is dependent on the productivity of the area. Consequently, continued coastal erosion and wetland deterioration will deprive the nation of vitally important fish, wildlife, and other wetland-related economic and environmental benefits.

Organizations in Louisiana, such as the Louisiana Wetland Educational Coalition (LaWEC) and the Jason Project have developed environmental science curriculums using Louisiana's unique wetland environment as the main educational focus. Coastal Roots, a nursery-based educational program for upper elementary to high school students, was initiated by Louisiana Sea Grant College Program and the LSU AgCenter in 1999. Coastal Roots provides youth with stewardship opportunities using a hands-on, field-based technique, but lacks the in-class teaching component of environmental science subject areas.

Classroom introduction of subjects such as horticulture is rare because educators generally do not have sufficient background in the subject area and are less likely to use it as a teaching tool. Even though many teachers are interested in science, they admit that they do not feel able to teach the subject (Harlen, 1997; DeJong, et al., 2002). The Youth Wetlands Education and Outreach Program is a statewide program that consists of environmental education lessons and activities, designed to heighten the awareness of Louisiana's youth to the unprecedented problem of wetland loss. The program supplies extensive material, including structured lesson plans, materials,





and step-by-step procedures to hands-on activities, to educators to increase teacher confidence when implementing a new environmental education curriculum.

The Youth Wetlands Education and Outreach Program promotes environmental awareness, ownership, and empowerment in Louisiana youth. This approach is based on an environmental education model developed by Hungerford and Volk (1990). The program inspires youth to act as environmental ambassadors by talking to their peers, parents, and other community members about protecting and restoring wetlands. The program helps students develop critical thinking and real-world problem solving skills, while teaching them to become environmentally responsible citizens (Chawla and Cushing, 2007). Providing youth with direct experience and increased knowledge of environmental action skills instills in students that they can make a meaningful contribution to preserving, conserving, and restoring Louisiana's wetlands (Hungerford and Volk, 1990).

Partners

AWCC AmeriCorps members assist in youth wetlands education programming efforts, specifically, the dissemination of information for the Youth Wetlands Education and Outreach Program. These members also provide assistance in the four camps associated with the program, 4-H Camp Grant Walker, LOST Camp, Marsh Maneuvers, and Wild Woods Wanderings.

In-kind contributions have been made to the Youth Wetlands Education and Outreach Program by the National Institute of Food and Agriculture (NIFA). These contributions include participation by teen leaders and 4-H Faculty at summer camps, after school events, and school enrichment activities. NIFA also contributes staff time, company resources, and marketing materials.

In conjunction with the educational and service-learning activities during the 2009-2010 school year, extension agents and program managers organized and delivered approximately 20,000 plants used in parish restoration projects. All of the plant materials used for these projects were grown either through greenhouse culture or from open field plots and were produced specifically for the Youth Wetlands Education and Outreach Program.

School and 4-H faculty in 58 parishes have participated in the Youth Wetlands Education and Outreach Program. Their participation, in collaboration with parent and community volunteers, has provided the program with the support necessary to become one of the leading wetland educational programs in the nation. In 2009, one hour of volunteer service was equivalent to \$20.85; therefore, it is estimated that the 3493 volunteers completing 2500 hours of service resulted in a savings of \$72,829 for the program (Independent Sector, 2008).

Corporate sponsors:

- Pepsi Company
- Entergy

Individuals from the following state agencies aided in the development of the Youth Wetlands Education and Outreach Program Curriculum:

- Barataria-Terrebonne National Estuary Program (BTNEP),
- Louisiana State University (LSU) College of Education,

- LSU School of Plant, Soil, and Environmental Science (SPESS),
- Louisiana Sea Grant College Program,
- Ponchartrain Institute for Environmental Sciences,
- Louisiana Cooperative Extension Service (CSREES), and
- America's WETLAND Foundation.

Program Delivery

- The Youth Wetlands Education and Outreach Program is dependent upon involvement from 4-H faculty, school faculty, America's Wetland Conservation Corps (AWCC) AmeriCorps members, and the Program Director.
 - AWCC AmeriCorps members have five required training sessions annually. Through these trainings, AWCC members learn about 4-H Youth Development, become prepared to work with youth, and increase knowledge of program materials.
 - 4-H and school faculty attend professional development training/workshops. During these work shops, participants are not only educated about available program materials, but are encouraged to develop skills to plan and lead groups.
 - The Director conducts a statewide promotional campaign to promote awareness and educate regional directors, 4-H faculty, school faculty, wetland conservation volunteer groups, and other professional organizations on the Youth Wetlands Education and Outreach Program.
- Youth Wetlands Week, held during the spring semester of the academic year, is a week of school-enrichment dedicated to increasing wetland knowledge. Educators teach the provided in-classroom lesson plans in the curriculum manual and conduct service-learning activities in their community. The majority of the lessons are designed to last one hour. Student activity sheets that expand on lesson materials are included with each lesson and can be completed in class or as a take home assignment. Additional experiential learning activities are available year-round to the students. Restoration projects, festivals, conferences, and workshops are a few examples of events offering volunteer opportunities to students.
- The Youth Wetlands Education and Outreach Program has four summer camps where youth participate in planned educational activities, while experiencing group living in an outdoor setting. In each camp, participants learn important life skills, such as problem solving, decision-making, communication, and team collaboration through a variety of activities. AWCC members, 4-H faculty, and community volunteers help lead the camps; therefore, they increase their knowledge on the subject being taught and improve leadership abilities and instructional skills.
 - 4-H Camp Grant Walker is a five-day camp for 4th 6th grade students held for nine separate sessions during the summer. Campers are exposed to field-based learning activities, video presentations, and lectures for four hours each morning of their stay.
 - LOST Camp, based on 4-H Set: Science, Engineering, and Technology Program, is a five-day camp for 7th and 8th grade students. Campers select three activity tracks in which to participate, with each track lasting up to seven hours a day. Camp activities include boat safety, video presentations, lec-





tures, laboratory exercises, and field-based projects.

- Wild Woods Wanderings is a five-day camp providing high school participants with first-hand experiences in a forested wetland ecosystem. Camp activities consist of outdoor survival skill training and classes on map and compass skills, water quality, public policy, pollution, and aquatic education. Night classes are also offered at this camp, meaning campers are immersed in forested wetland education for up to 12 hours each day.
- Marsh Maneuvers is a five-day camp held the Rockefeller Wildlife Refuge in Grand Chenier, Louisiana. High school students are immersed in wetland ecology lessons, including fishing, crabbing, cast netting, water chemistry testing, wildlife observation, seafood processing, boating, policy debates, and more, for eight hours every day.

Program Evaluation and Outcomes/Impact

Methods

Evaluation of the Youth Wetlands Education and Outreach Program included:

- 1. Assessment of program content by educators who participated in the Youth Wetlands Education and Outreach Program,
- 2. Pre- and post tests to assess the knowledge gained from involvement in the Youth Wetlands Education and Outreach Program completed by students who participated,
- 3. Pre- and post tests to assess the knowledge gained completed by campers at Marsh Maneuvers,
- 4. Pre- and post tests to assess the knowledge gained completed by campers at Wild Woods Wanderings, and
- 5. A review of program content performed by the Program Director and a selected committee.

Process

Following implementation of Youth Wetlands Week (April 2010), a Teacher Assessment Survey, prepared by the Program Director in collaboration with an extension specialist and selected parish educators, was distributed to assess the functionality, applicability, acceptance, and overall success of the Youth Wetlands Education and Outreach Program.

In 2009-2010, five educators per parish (320 teachers total) were randomly selected for the Teacher Assessment Survey; 86 were completed and returned (28.6% return rate). Results showed that the overall response to the program was an average 94% approval rating (out of a possible 100%). When asked if they would participate in the program again, 78% of teachers responded positively. Based on recommendations from teacher evaluations, materials for the program were expanded to include more grade levels, new lesson plans and materials list have been developed, and online registration forms have been made available to educators.

Outcomes and Impacts

A pre- and post test, specific to each grade level, was given to the students participating in the 2009-2010 Youth Wetlands Education and Outreach Program. Out of the 55,000 student participants, 6,562 pre and post tests were completed and returned (12% return rate). The mean pre-test score was 46.8% and increased to a mean

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post-test score of 58.4%. Because the lessons are associated with Louisiana GLE's, these results indicated that general science knowledge increased on average of 28% across grades 4-12 (p<0.001).

A pre- and post test was given to participating students during four sessions of Marsh Maneuvers. Forty-two campers representing 16 Louisiana parishes participated in four sessions of Marsh Maneuvers during the summer of 2010. Combined pre- and post test results showed an overall improvement in test scores at the conclusion of camp, with the average score increasing 17% across grades 7-12. Specifically, results of session averages indicated that Session 1 scores increased 14.9%, Session 2 increased 18.0%, Session 3 increased 18.0%, and Session 4 increased 18.0%.

During Wild Woods Wanderings, a pre- and post test was completed by the youth participants at each session. Thirtyeight youth participants, representing 14 parishes in Louisiana attended the camp during the two summer sessions held in 2010. The pre-test average was 40% and the post test average was 57%, indicating a 17% increase in scores.

Program plans are to develop a longitudinal study to track environmental stewardship of youth participants that have been involved in multiple years of wetland-related educational activities through the Youth Wetlands Education and Outreach Program.

Evidence of Sustainability

In the first year (2007), participation in the Youth Wetlands Education and Outreach Program reached 22,000 students in 46 parishes. Program participation has increased steadily with 50,000 students in year two, 55,000 students in year three, and approximately 80,000 registered for 2011, resulting in a 45% annual growth rate from 2010 to 2011.

The Youth Wetlands Education and Outreach Program curriculum is geared towards grade specific benchmarks mandated by the Louisiana Department of Education, otherwise known as GLE's. The program lessons prove to be an excellent curriculum source for educators aiming to incorporate science into their learning objectives. Schools participating in the Youth Wetlands Education and Outreach Program are able to keep all materials even after the lessons are complete and past materials are available for download on the program website. New lessons are implemented for every grade level each year so students will continue to receive fun and interesting information on the current issues facing Louisiana's wetlands. To encourage participation, a stipend is provided to parishes that successfully complete the program and return pre and post tests, along with teacher evaluations.

Participation by local and state 4-H faculty and in-kind contributions from various state agencies aid program implementation. Although the program is managed by a Director, the success of the Youth Wetlands Education and Outreach Program is dependent upon volunteers, including teachers and other school faculty, parents, and supporting community members. These volunteers are especially critical to the design and implementation of large-scale restoration projects. Allowing volunteers to be involved the development of program curriculum and restoration projects will promote long-term service and the recruitment of new volunteers.

Corporate sponsorships and donated materials defray the cost of program. Funding was originally secured for three years from the Louisiana Department of Natural Resources (LDNR). In 2010, the YW Program was refunded for an additional three years by the Louisiana Office of Coastal Protection and Restoration (OCPR).

Considerations for Replication

The preservation of valuable estuaries is not just a Louisiana concern because wetlands occur in every state. The



Youth Wetlands Education and Outreach Program could easily be replicated in other states with cooperation from 4-H faculty, school educators, parents, and community volunteers. Many state agencies, such as LDNR and OCPR, have an educational component and agreements between these agencies and the 4-H Youth Development Office, can aid in program implementation. Current estimates show that program implementation costs approximately \$9.00 per student, which is an all-inclusive amount.

The existing curriculum teaches general facts about wetlands; therefore, the lessons could be distributed as is, or tailored to specific habitat found in the particular state. The positive response from participating youth at summer camp indicates that the outdoor experiential learning is beneficial to their understanding of wetland knowledge. Because the success of the program relies heavily on volunteer recruitment, efforts should be made to involve environmentally-based organizations that have a mission statement that pertains to service.

References

- Barras, J. A., Beville S., Britsch D., Hartley S., Hawes S., Johnston J., Kemp P., Kinler Q., Martucci A., Porthouse J., Reed D., Roy K., Sapkota S., & Suhayda J. (2003). Historical and projected coastal Louisiana land changes:1978-2050. U.S. Geological Survey Open File Report, 3-334.
- Barras, J.A. (2006). Land area change in coastal Louisiana after the 2005 hurricanes—a series of three maps: U.S. Geological Survey Open-File Report 06-1274.
- Boesch, D.F., Josselyn, M.N., Mehta, A.J., Morris, J.T., Nuttle, W.K., Simenstad, C.A., & Swift, D.J. (1994). Scientific assessment of coastal wetland loss, restoration and management in Louisiana. *Journal of Coastal Research, Special Issue* 20,1-103.
- Chawla, L. and Cushing, D.F. (2007). Education for strategic environmental behavior. *Environmental Education Research*, 13 (4), 437-452.
- De Jong, O., Korthagen, F., & Wubbels, T. (1998). Research on science teacher education in Europe: Teacher thinking and conceptual change. *International Handbook of Science Education*, Dordrecht, Kluwer Academic Publishers, 745-758.
- Harlen, W. (1997). Primary teacher's understanding in science and its impact in the classroom. *Research in Science Education*, 27, 323-337.
- Hungerford, H. & Volk, T. (1990). Changing learner behavior through environmental education. *Journal of Environmental Education*, 21 (3), 8-21.

Independent Sector. (2008). Value of Volunteer Time. URL <u>http://www.independentsector.org/programs/research/volunteer_time.html</u>.

- Karsh, K.L. (2002). Integrating horiticulture, biologly, and coastal enivronemntal issues into the middle school science cirriculum. Unpublished manuscript, Louisiana State University, Baton Rouge, LA.
- National 4-H Council (2007) 4-H Science, Engineering and Technology: A Strategic Framework for Progress. Retrieved October 29, 2008, from <u>http://www.fourhcouncil.edu/setresources.aspx</u>.
- National Center for Education Statistics (NCES). (2005). NAEP: The nation's report card: Science. Retrieved October 29, 2008, from <u>http://nces.ed.gov/nationsreportcard/mathematics/</u>.
- Thompson, J.E. (1999). The current and future needs and production of engineers and scientists in the United States. *12th IEEE International,* 1, 29-32.



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4-H SET Afterschool Program

Abstract

The 4-H SET (science, engineering and technology) Afterschool Program is delivered throughout the year, including 18 weeks during afterschool hours at three school-based sites and five weeks during the summer at seven sites, reaching over 300 youth with 20 hours of project driven science learning. Innovative ways of delivering SET programming were piloted to develop 4-H Science Abilities and leadership skills, promote an interest in science careers, and partner with the community to enhance educational readiness. Partnering for program delivery is emphasized to leverage networks, resources, and opportunities to reach youth traditionally overlooked by science programs, including girls. Topics include exploring scientific methods, 4-H Aerospace, and 4-H Digital Storytelling. Several evaluation strategies were implemented at different phases of the program including: the Youth Engagement, Attitudes, and Knowledge (YEAK) Survey (see <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>), authentic evaluation, skill-a-thon, interviews, and focus groups with 6th grade girls. Outcomes include the establishment of 4-H SET Afterschool Clubs, teens recruited to mentor and teach younger youth, and new opportunities for youth to be involved in science programs.

Program Needs

The Houston 4-H SET Afterschool program is aligned with state and local efforts to improve science and math achievement among youth attending Precinct2gether Inc. extended day programs in east Harris County Precinct 2. Texas ranks 29th among states graduating students into careers as scientists, and ranks first in the number of high-tech jobs lost between 2000 and 2005. Science education achievement gaps continue to be significant among economically disadvantaged youth. In Texas, economic development is dependent on sustaining a workforce with scientific and technological expertise. Texas AgriLife Extension Service partnered with Harris County Precinct 2 Youth Services to impact educational readiness in science, engineering and technology with afterschool enrichment to improve academic success and future college education opportunities for youth in those fields.

Targeted Audience

The program targets middle school age minority youth attending school in Galena Park Independent School District. Ninety percent of these youth are from Spanish speaking families residing in the highly industrialized and impoverished areas of east Harris County.

Program Goals and Objectives

The 4-H SET Afterschool program was implemented to provide youth at risk for academic failure with opportunities to participate in program areas including computers, aerospace, science filmmaking, and scientific method hypothesis testing.

The program goals are to:



- 1. Support academic enrichment for Science Abilities with opportunities to participate in science, engineering and technology projects.
- 2. Increase interest and explore careers in science, engineering and technology fields.
- 3. Improve leadership, life skills in critical thinking, communication, teamwork, goal setting, responsibility, lifelong learning and positive attitude.
- 4. Partner with teachers and community leaders to promote family inclusiveness in the educational readiness process.
- 5. Establish 4-H Afterschool project clubs to expand the 4-H SET experience and develop caring relationships with adults.

Program Design/Curricula and Materials

The program design evolved over two years with feedback from site staff, youth, and data from evaluations. Content and topics were selected to fit with youth interests. Most youth will tell you they love science stuff if it is messy, does something weird or blows up. A series of stand-alone activities which do not require prior knowledge were introduced in the first six weeks of the program to explore scientific methods. Sessions that appealed to both boys and girls included: making goo, seven layer density, and colored milk. Youth work cooperatively in "science pods" to perform experiments, test hypothesis, and record data in a lab book.

Sessions to support scientific methods were adapted from teacher lessons on websites. During each activity, groups reflected upon the activity, shared and answered questions to explain what they discovered. Topics evolved from those aligned with the scope and sequence for 5th grade science, to youth centered topics and activities. Youth expressed an interest in the environment. <u>The National 4-H Science Day Experiment curriculum</u> was used to explore issues such as Bio Fuels, Oil Spill Clean Up and 4-H2O. More complex project driven activities were added as the program progressed and youth gained confidence with the scientific method. A 4-H Aerospace series culminated in a Speed Lab Skill-A-thon that reinforced leaning concepts on the "forces of flight."

Engineering design challenges were implemented to promote team building, communication and problem solving. The challenges support inquiry based learning which is non linear unlike the scientific method's step-by-step approach to problem solving. Technology was interjected into the science learning process with filmmaking. The 4-H SET Digital Storytelling project included completing 4-H Filmmaking Modules online, researching a science issue impacting the community and producing a short film with a "call to action." Different approaches to evaluation were considered at each phase of the program including authentic evaluation of science lab books, quality of projects completed, and direct observation of 4-H Science Abilities.

Knowledge and Research Base

Research shows that school-based afterschool programs designed to supplement the school day run the risk that youth will not be motivated to participate (Yholem & Shouse, 2009). Most experts agree 4-H science programs need to be informal; they cannot look or feel like school (Schwarts & Noam 2004). The experiential "learn by doing" model is the "Fun Factor" catalyst for afterschool science learning. Com-

mon characteristics shared by successful programs include, support for learning through mentoring, cooperative learning, and connecting youth to community (Peterson & Silbi, 2007). The program trained teenagers to mentor youth projects, used group project work to facilitate learning, and established 4-H clubs to nurture science learning. 4-H SET Afterschool implements activities that support development of 4-H Science Abilities (National 4-H Council, 2008), is aligned with the 2009 National 4-H Council Science Logic Model (National 4-H Council, 2009), and meets the requirements of the 4-H Science Program Checklist.

One checklist requirement is inquiry-based learning. Staff facilitate discovery. They do not ask too many questions, or provide too much information. Youth have time to test their ideas and time for interaction. They can manipulate materials and repeat experiments to test different variables. Project based learning opportunities help youth build on the knowledge base gained from stand alone activities, and help them apply what they learned to complete more challenging projects (National 4-H Council, 2009). Projects are introduced to support engineering and design skills, and deeper investigation of science phenomenon.

Partners

The Harris County 4-H Urban Youth Development program partnered with Precinct 2 Youth Services and Precinct2gether Inc. to deliver weekly 4-H science afterschool programs at three sites, reaching 75 youth. The program also conducts five-week 4-H Science Summer programs at six sites reaching over 300 youth. The partnership was cultivated over several years by introducing new resources, collaborating on summer staff training, and establishing a planning team consisting of Extension and Precinct 2 Youth Services administration staff that meets monthly. Extension 4-H staff attend Precinct 2 Youth Services administrative meetings to assist with the program planning, suggest resources, curriculum, and plan training for site staff to improve program delivery. Common program goals were identified in the planning process, and the team collaborated to pursue additional funding to support new educational opportunities for youth.

Funding

In 2008, Texas AgriLife Extension Service, Texas 4-H, Harris County 4-H Youth Development Program and Harris County Precinct 2 Youth Services collaborated to secure a National Institute of Food and Agriculture (NIFA), USDA Children Youth and Families at Risk (CYFAR) Strengthening Communities Grant to fund 4-H Ready SET Go for Educational Preparedness. The grant funds a full-time program assistant, travel, professional development, and resources for program delivery. In addition, Harris County Precinct 2 Youth Services secures funding through Precinct2gether Inc., a 501(c)3 to fund staff for their extended day school-based programs, which provide help with homework, recreation, and afterschool enrichment programs.

Staffing

Precinct 2 Youth Services coordinates site staff, consisting of teachers paid for extended day programs and student aids recruited from area high schools. Extension staff provide lesson plans, resources, and conduct sessions with support from site staff. Site staff gain practice working with science content delivery, and duplicate the session with additional youth. Summer programs are expanded to six additional sites. Extension personnel train summer staff, and provide lessons, resources and teaching plans to support program delivery by site staff. In addition, Extension staff conduct programs with middle school youth at two sites, staffing with teenagers as cross-age teachers and mentors for projects. This strategy builds capacity and expands program outreach to new youth.





Program Delivery

A series of six experiments to explore scientific methods were conducted by youth working in "science pods" to identify characteristics of acids and bases, liquids, and chemical reactions. Youth performed experiments, recorded results in lab books and made conclusions about the results. The following year, a series on the Diet Coke Mentos experiment followed a science fair project format, with youth performing the experiment, testing different variables, recording measurements, collecting data and producing a video to explain the chemical reaction.

The 4-H Aerospace series was a combination of stand-alone activities with similar knowledge and skills that reinforce learning from the previous experience. Youth completed five sessions from Aerospace Adventures (National 4-H Cooperative Curriculum) on the "forces of flight" to design parachutes, straw rockets, balloon rockets and balloon shuttles. Teams recorded test data and responded to questions on worksheets. At each session, teams were awarded points for completing activities to qualify for the Speed Lab Skill-A-Thon. The top five teams competed in the Speed Lab Skill-A-Thon, and others were assigned duties as trouble shooters, looking for "what went wrong." Each team had one hour to construct a JET-STREAM balsa wood airplane powered by competition rubber band motors and conduct speed lab tests. Site staff served as judges, using a checklist to identify specific 4-H Science Abilities, such as problem solving, building and constructing valid tests, and drawing conclusions. Each team turned in Speed Lab reports, calculating distance and speed to earn points. The top five placing teams were ranked and youth received prizes, certificates and ribbons. The next week all youth participated in the Skill-A-Thon. Each child received certificates and resource books from the 4-H Aerospace program.

The 4-H SET Digital Storytelling project required youth to work in production teams, complete a series of online 4-H Filmmaking Studio modules, identify and research a science issue impacting their community, and produce a short film with a "call to action." This project, conducted in both afterschool and summer programs, included over 20 one-hour sessions and extra support to ensure completion. Environmental issues identified by youth included: recycling at school, styrofoam trays, the oil spill, sea of trash and air quality in Houston. Producers of Houston's Green Spot surveyed peers, collected data on a questionnaire, created a pie chart and interpreted results on school recycling attitudes. They produced a debate exploring both sides of the issue and asked peers to do more recycling to protect the planet. Teenagers from the high school media department were trained to work with each production team and mentor projects. As part of the inquiry based learning experience, a panel of experts was interviewed by youth, and field trips were made to area agencies addressing science-based issues. These activities connected youth to the community and a network of professionals with careers in science-related fields.

Six engineering design challenges were introduced throughout the year to engage teams in cooperative learning to solve problems. Youth were challenged to build a bridge out of newspaper, design a protective container for the "egg drop" contest, and make a space rover from recycled materials to explore Mars. These challenges were rated high on the "Fun Factor" as favorite activities by youth, and site staff reported kids were learning to work together on problem-solving strategies.

Recognition of Participants

Recognition is given for both completion of a project or series of sessions and for achievement in an event. A chance to participate with peers on a winning team promotes cooperation, teambuilding, and a sense of achievement. Contests, challenges and skill-a-thons motivate youth to complete projects and provide opportunities to recognize youth. Both site staff and youth agree that recognition with prizes, ribbons and certificates helps participants feel a great sense of accomplishment. Certificates and resource books are awarded at the end of an educational series to extend the learning with families and siblings at home. The summer program includes a showcase of youth projects, with families and key stakeholders invited to celebrate youth achievements. In addition, leadership opportunities and titles are awarded to "top teams." Groups who complete tasks are offered special assignments such as assisting with project set-up, roles as lab assistants, or called on to demonstrate an experiment. Feedback from site staff suggests that it is important to find ways to recognize youth every day for participation.

Program Evaluation and Outcomes/Impact

The 4-H SET Afterschool and summer programs reach over 300 minority youth annually, providing opportunities to participate in science programs, and have trained 35 site staff to support delivery of project based science activities. Several methods of evaluation are used to measure outcomes and guide program design. Considerations for evaluation included using a variety of methods with direct feedback from youth and staff.

A Pre/Post SET Abilities Survey provided inconsistent results as ESL youth struggled with understanding terminology. Authentic evaluation data collected from 4-H SET lab books provided weekly reference on 4-H Science Abilities: answer and form questions, record data, test hypothesis, and make observations about each scientific experiments. This information was used to adapt activities for youth struggling with English as a second language by increasing visuals and adding support materials for science literacy.

In January 2009, a 4-H SET Aerospace Speed Labs Skill-A-Thon was conducted to observe 4-H Science Abilities as youth worked in teams to construct and fly a JETSTREAM Balsa wood plane tethered to a pylon. Forty 5th and 6th graders worked in teams to construct the planes, set up pylons and set the tether to the plane wing for flight trials. Site staff used check sheets to record 4-H Science Abilities observed, and assigned scores on a scale of 1 to 5 for the following: (a) solved problems/developed solutions, (b) constructed adapted plane designs, (c) conducted timed flight tests, (d) measured distances, (e) recorded data, (f) performed calculations, (g) used verbal and written communication skills, and (h) drew conclusions after each flight. Sixty two percent of youth scored over 75 of 100 points demonstrating 4-H Science Abilities. Staff noted youth used problem solving skills, ingenuity and resourcefulness to finish the Speed Lab trials.

In April 2009, a survey of participants and site staff was conducted. Both written and videotaped responses provided information to assess client response to the program. Sixty-three youth and six site staff responded to open-ended questions: What do you like best about the program, what do you like least, what did you learn, and what would you change about the program. The "Fun Factor" was reported by 95% of the participants to be "what they liked most about the program," followed by, "we get to do experiments," and "I like the engineering and aerospace activities." The least favorite part of the program was, "too much writing," which referred to the lab books, and "not enough time." Youth indicated they learned, "how to make gliders fly better" and "make ex-





periments and follow directions." Staff reported they observed youth were excited about the activities and that the youth were working together to complete projects.

Summer 2010, the 4-H SET Digital Storytelling Project engaged youth in the process of making a short science film on an issue impacting their community. They worked in production teams to research the issue, narrow the focus of the film and identify a call to action. Six films were produced on issues ranging from air quality and recycling to the oil spill clean-up in the Gulf. The Youth Engagement, Attitudes and Knowledge (YEAK) Survey was administered at the end of 20 hours of programming. Eighty-four percent of participants responded "usually or always" to questions on critical thinking. Teen teachers worked with youth on all phases of research, planning, filming and editing the project. They reported that youth were excited about their films, shared roles and worked together to get the job done.

An important outcome was to connect families and staff to the 4-H SET program. In 2010, 4-H SET Afterschool Clubs were established at two sites. Youth elect officers and provide leadership for recreation and service projects. Clubs meet once a month with site staff serving as club advisors. The establishment of 4-H Clubs increased youth interest in 4-H science projects and motivated youth to take on leadership roles in the program.

Evidence of Sustainability

Partners are committed to planning for program sustainability and work to secure funds, leverage resources, and develop volunteers to support program delivery. Extension 4-H staff attend monthly program planning meetings and bring expertise for science program development. A network of civic organizations, local businesses and industry are invested in the Precinct2gether Inc. extended day program, providing funding to expand the educational outreach. Through this collaboration, new ideas for better ways to partner with other networks are developed, and new opportunities to bring more comprehensive science experiences to youth are possible. Plans for program expansion include establishing new 4-H SET Afterschool programs at area feeder schools serving higher grade levels. This will provide youth currently involved in 4-H SET an opportunity to stay engaged with the program through high school.

Considerations for Replication

The 4-H SET Afterschool Program is a work in progress. It is expected that adjustments may need to be made, and it is important to listen to partners at all levels from administration to site staff, and work toward common goals for program successes. Partnering with established afterschool programs provides a sound foundation for collaboration. Building relationships with site staff at each school site is important to the success of any program. Extension 4-H staff conduct workshops to train site staff, work "shoulder to shoulder" with them on program delivery, and consistently ask for feedback. This support in the field at school sites, working one-on-one with site staff provides valuable information for the planning team as changes are made and new programs are initiated.

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References

AERO Labs, Planes and Supplies (2009) <u>http://www.acsupplyco.com/aerospace/acglider/guillows_skystreak.htm</u>

Evaluation YEAK Survey - http://www.4-h.org/about/youth-development-research/science-program-research/

- National 4-H Council (2009), 4-H Science 101: A Guide to Development, Delivery and Assessment of 4-H Science Programs. Retrieved June 4, 2009 from <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>
- National 4-H Council (2008), Science, Engineering and Technology Criteria Checklist Retrieved January 2, 2009 from <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>

National 4-H Council, National 4-H Science Day <u>http://www.4-h.org/4-h-national-youth-science-day/nysdhome.aspx</u>

National 4-H Filmmaking Studio http://www.4-h.org/curriculum/filmmaking/

- National 4-H Cooperative Curriculum, Aerospace Adventures, <u>http://new.4-hcurriculum.org/catalog.</u> <u>aspx?cid=162&c=Aerospace</u>
- Nippolt, Larson, Hui-Hui Pamela, Hui-Hui, Wang. (2010). Engaging Youth in Non-formal Learning Through Experiential Learning and Inquiry-based learning Methods.
- Peterson, Terry K. and Fix, Sibi. Afterschool Advantage: Powerful New Learning Opportunities, Publisher, Foundations Inc.2007 ISB 978097912548 <u>http://www.tascorp.org/content/document/detail/1721/</u>
- Schwartz, S. and Noam, G Informal Science Learning in Afterschool Setting: Natural Fit? 2004, <u>http://informalscience.</u> <u>org/researches/Schwartz_abd_Noam_Commissioned_Paper.pdf</u>
- The After School Corporation. (2009). Science Afterschool: How to Design and Run Great Programs. Noyce Foundation, <u>http://www.tascorp.org/content/document/detail/3148/</u>
- The Giant Encyclopedia of Science Activities for Children 3 to 6: More than 600 Science Activities Written by Teachers for Teachers <u>http://www.theteachersguide.com/QuickScienceActivities.html</u>
- Yholem, Nicole and Shouse, Andrew. Forum for Youth Investment, National Research Council- Linking After-school Programs and STEM Learning: Proceed with Caution, Equity and Excellence in Education, 35(1), 43-49.

In Partnership With









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Big Urban Woods 4-H Club

Abstract

The Big Urban Woods 4-H Club is composed of 20 students in grades 4-6 at American Indian Magnet School, in St. Paul, Minnesota. The program is conducted at the end of the school day for two and a half hours one day a week. Youth take regular walking field trips to a 5-acre plot of land less than a mile away called The Big Urban Woods. Located in one of the most economically stressed neighborhoods of the city, this area had been used as an informal dumping ground for years until a group of concerned community-members began to clean it up on their own. The Big Urban Woods 4-H Club has since adopted it as an on-going service learning project, and has played an integral role in lobbying with the city of St. Paul and the Minnesota Department of Natural Resources to preserve the Big Urban Woods as one of over a hundred School Forest Programs. The Big Urban Woods 4-H Club allows youth to explore the natural world in the context of Ojibwe and Lakota cultures. Its purpose is to engage youth in service learning projects that raise public awareness of the Woods and use the area to educate youth about wildlife identification, preservation, photography, and journaling, as well as to teach them how traditional Ojibwe and Lakota cultures use plants and other wildlife, such as in art and medicine-making. Technology is infused in the curriculum through use of cameras, GPS/GIS units, and computers to complete projects and learning/leadership portfolios. The aim of the program is to ignite youth excitement about learning and help them develop tangible learning, leadership, citizenship, and technology skills that can help them build a sense of hope and expectation for future educational and career opportunities.

Program Needs

The primary goal of the program is to help youth connect their learning and interests to potential higher education and career opportunities. This goal is based on a number of findings that shed light on the importance of post-secondary education.

Native Americans are the most underrepresented group in science and technology fields compared to their percentage of the US workforce (Commission on Professionals in Science and Technology, 2005). Nationally, the poverty rate of urban Indians is 20.3 percent compared to 12.7 percent for the general urban population. The unemployment rate of urban Indians is 1.7 times higher than that of non-Indians in urban areas, and urban Indians are 1.7 times less likely to have a high school diploma than non-Indians (National Urban Indian Family Coalition, 2008). Low-income students are much less likely to pursue post-secondary education (Baum & Payea, 2004), and according to the U.S. Bureau of Labor Statistics, nearly two-thirds of the fastest growing occupations through the year 2012 will require post-secondary education (Bureau of Labor Statistics, 2004). According to a study published by the College Board, "any college experience produces a measurable benefit when compared with no postsecondary education," including higher lifetime earnings, lower rates of poverty and unemployment, and higher school readiness of children whose parents have attended college (Baum & Payea, 2004). In fact, studies indicate that children of parents who have not attended college are less likely to do so themselves than children of parents who have (Baum & Payea, 2004).



Targeted Audience

The target audience is middle school youth (grades 5-8, approximately 10-14 years old) who are eligible for free or reduced school lunch. With this particular club, the audience includes youth in Native American families from varied tribal backgrounds.

Program Goals and Objectives

1. Youth in the program will build tangible skills for driving their futures and will see a real and hopeful connection between their learning and interests and potential higher education and career opportunities.

Objectives:

- Parents will engage with youth in setting educational goals.
- Youth will set short-term and long-term personal education goals in the context of careers and higher education.
- Youth will exhibit mastery in a topic area of their choice through development and presentation of learning/leadership portfolios.
- 2. Youth will understand themselves as positive leaders for themselves, their communities, and the world.

Objectives:

- Youth will work with adults to create and engage in service learning projects.
- Youth will demonstrate growth in personal leadership skills and knowledge through creation and presentation of learning/leadership portfolios.
- Youth will work with adults to increase public awareness of the Big Urban Woods through public presentations, showcasing of student work, and website development about the Big Urban Woods.
- Youth will gain knowledge and understanding about the role of nature in Ojibwe and Lakota cultures.
- 3. Youth will gain scientific and technological literacy in the context of environmental conservation.

Objectives:

- Youth will learn basic plant and wildlife identification and record knowledge through nature journals, photography, and contributions to website content.
- Youth will demonstrate growth in technological literacy through activities focused on digital photography, videography, GPS/GIS, and website development.

Program Design/Curricula and Materials

The program leader developed the <u>Organic Middle School Youth Program Model</u>, which is designed to meet middle school youth where they are in terms of age, culture, gender, education level, language-base, and socio-economic status, and enable them to achieve educational success (see Skuza, 2004). The model is organic, which means that it is developed from the community up rather than from the program down, while using a research base to inform develo

opment. This design provides a structure conducive to middle school development and learning and fluidness needed to engage youth as individuals in an inclusive group setting over time. The model is intended to help at-risk youth own their learning by igniting their interest in education while facilitating a process to craft long-term educational plans. The model includes a parent/guardian component designed to involve families through home visits, orientations, and quarterly empowerment sessions to reinforce that parents are the child's first educator.

Curricula and materials utilized include the following:

- WeConnect: An opening to the world (Skuza, Russo, & Hurtado, 2009)
- Skuza, J. A., Russo, J. P., Gates, E. F., & Kawase, M. (2006). Urban youth lead: Becoming the authors of their *lives*. Minneapolis: Regents of the University of Minnesota.
- Peterson's Guides to Trees, Flowers, Herbs
- Leslie, C. W. & Roth, C. E. (2003). *Keeping a nature journal: Discover a whole new way of seeing the world around you.* North Adams, MA: Storey Publishing.
- Louv, R. (2005). Last child in the woods. Chapel Hill, NC: Algonquin Books.

Knowledge and Research Base

The adult facilitators work hard to deliver a program that respects the youth as human beings, allows them to explore their interests in the context of their cultural heritage, and provides a highly engaging means for youth to understand their learning and leadership. The following base of research is used in the development of the program and curricula.

21st Century Learning and Leadership. According to the Partnership for 21st Century Skills, the U.S. has shifted from a manufacturing to a service-based economy, requiring a different set of skills focused on knowledge, creativity, and innovation, not just in the highest-level jobs, but in jobs across the spectrum of the workforce. Twenty-first century learners should be able to think critically, communicate and collaborate across cultural, geographic, and other boundaries, and lead utilizing the skills and talents of others (Partnership for 21st Century Skills, 2008). Most importantly, they have the ability to drive their own learning because they understand how and what motivates them to learn (Skuza, Russo, & Hurtado, 2009). The Big Urban Woods program provides intentional space for young people to understanding their learning, discover their interests, develop focused skills, and then connect these skills and interests to future learning possibilities. To accomplish this goal, the program focuses on self-directed learning, innovative leadership, and global awareness and citizenship as 21st century skills that can help youth carve positive pathways to drive their futures.

Experiential and Inquiry Learning Methods. More than simply "learning by doing," experiential learning calls for personal involvement, promotes self-discovery, inspires self-initiative, and fosters critical thinking. It takes youth outside of themselves, as they share and process the results of their experience and begin to connect their learning to real experiences (Dewey, 1938). Inquiry is an approach highly complementary to experiential learning in that it incorporates reflection into every aspect of the learning process and allows youth to explore topics in a way that builds on their natural curiosity (National Research Council, 2000).

Service Learning. The many benefits to meaningful service learning include an increased sense of self-efficacy, higher academic achievement, interest in future education, and improved problem-solving, teamwork, and planning skills (Roehlkepartain, 2007). According to the National Youth Leadership Council's standards, service-learning: (a) actively





engages participants in meaningful and personally relevant service activities; (b) is intentionally used as a strategy to meet learning goals; (c) incorporates ongoing, challenging reflection that explores the relationship of self to society; (d) promotes understanding and respect among diverse participants; (e) provides youth with a strong voice; (f) addresses community needs; (g) engages participants in an ongoing process of improvement and sustainability; and (h) lasts long enough to address community needs and desired outcomes (National Youth Leadership Council).

International Education. An international education approach helps learners understand their reactions to unfamiliar viewpoints, contexts, and situations. With this approach, youth come to understand that they are participants in a global society, inspiring a sense of understanding and confidence in relating and connecting to other people and preparing them to thrive in culturally diverse settings by giving them the opportunity to learn and use culturally responsive skills and knowledge (Skuza, Russo, & Hurtado, 2009).

Partners

- American Indian Magnet School
- St. Paul Area Council of Churches
- St. Paul Community Education
- St. Paul Parks and Recreation
- Conservation Corps Minnesota, Minnesota Department of Natural Resources

Funding

- USDA Children, Families, and Youth At-Risk (CYFAR) project
- St. Paul Area Council of Churches
- St. Paul Community Education

Staffing

- The UMN Urban 4-H Extension Educator serves as the local project director for CYFAR (Children, Youth and Families at Risk) programs in St. Paul, the Big Urban Woods 4-H Club being one of two of those programs. The project director oversees management of the St. Paul portion of the grant, leads the development and implementation of the program vision and outcomes, and nurtures relationships with primary partners.
- The Urban 4-H Program Coordinator coordinates implementation of grant expectations and works with the intern to design, adapt, and implement curricula related to 4-H, leadership/citizenship development, global/cultural competence, and awareness of higher education and career opportunities.
- The Urban 4-H intern works with the Coordinator to design and implement curricula, and coordinates activities and field trips related to 4-H, leadership/citizenship development, global/cultural competence, and awareness of higher education and career opportunities.
- The Native American cultural liaison teaches youth about Ojibwe and Lakota methods of identifying, collecting, and preserving herbs for basic medicinal uses. The liaison serves as the nature guide during hikes

through the Big Urban Woods, and is also well-connected with the Department of Natural Resources and other city and community efforts of conservation.

• There are two program facilitators (from the American Indian Magnet School). The first facilitator teaches youth about photography and website development, and works with the intern and cultural liaison to help youth design their service learning projects. The second facilitator teaches youth drawing and writing techniques for nature journaling and helps youth design their service learning projects. Both also serve as cultural liaisons, helping to carry out the delivery of the program in a manner appropriate to the preservation of Native American cultural heritage.

Program Delivery

Participants are students or alumni of American Indian Magnet School, and stay after school to meet once a week for two and a half hours. In addition to time spent in the school building, part of their time is spent in a 5-acre plot of wooded land close to their school called The Big Urban Woods.

The program begins with 4-H learning activities, led by 4-H staff, that tie into the main activity. These learning activities are focused on building group cohesion and personal awareness. Youth learn about personal learning and leadership styles using the Ojibwe and Lakota clan system, they build community awareness and global citizenship through activities in the *WeConnect* curriculum, they reflect on their learning in their nature journals; and they set SMART goals for their time in the program using these principles. Specific lessons on these topics are incorporated into the activities. This time sets the tone for the day in a way that helps the participants latch on to specific skills they will be using throughout their time in the program and introduces the main activity. This time is also used to help youth make decisions about the program.

The main activities, led mainly by school and community staff/volunteers, focus on exploration of the natural world through journaling, photography, plant identification, and medicine-making. Youth learn what herbs can be used for basic first aid, and prepare the herbs using traditional Ojibwe and Lakota methods. In the fall, they collect seeds from the Big Urban Woods to be planted in the spring, and they learn to identify which plants are growing in the Woods, to be added to the growing list on the *Big Urban Woods* website. Participants collect flowers and plants to make paper, which is included in their nature journals. These nature journals are brought out to draw and record the wildlife they find and to reflect on their learning. In the winter, youth spend time learning about the significance of Ojibwe and Lakota art, which is based on native plants and flowers. They then design their own bandolier bags using this art. Throughout the program, youth are using the knowledge gained to complete service-learning projects and presentations that incorporate the use of photography, GPS/GIS units (used to map trails and create geo-caching courses through the Woods), and the development of a Big Urban Woods website to increase public awareness of the Big Urban Woods.

Quarterly parent meetings will be scheduled to showcase youth learning and empower parents to understand how they are their child's first educator. Speakers will be brought in to talk with parents about relevant topics, including resources in St. Paul for Native students, how they can prepare their children early for high school graduation requirements and college readiness, and how they can work with their child to set and meet educational goals.

Recognition of Participants

Youth in the Big Urban Woods 4-H Club are developing portfolios that document their learning, and parts of these portfolios (photographs, letters to city commissioners) will be displayed in St. Paul's city hall.





In addition, throughout the program, youth have been working on the development of a website for the <u>Big Ur-</u> <u>ban Woods</u>, where their letters, photographs, lists of identified wildlife, and other work is displayed. The youth and adults will be presenting this website at meetings and events (i.e., other 4-H club meetings, city meetings, fairs, Urban 4-H showcase) that can help further the cause of educating the public about the area.

American Indian Magnet School shows their work in special display cases in the school, and youth present at school Powwow's and culture fairs throughout the year.

Youth presented a skit about the Big Urban Woods to 200 other 4-H youth and their families at our Urban 4-H Showcase Event. Similar to a county fair, they will be judged and have the opportunity to win a ribbon or a trip to the Minnesota State Fair to present and compete again.

Youth have an end-of-year celebration, where they will have the opportunity to present their learning portfolios to their parents and share reflections of their time in the program in a more intimate setting.

Program Evaluation and Outcomes/Impact

Short Term:

- 1. Youth will set short-term personal education goals.
- 2. Youth will demonstrate growth in personal leadership skills and knowledge.
- 3. Youth will demonstrate growth in technological literacy.

Long Term:

- 1. Youth will set long-term personal education goals in the context of careers and higher education.
- 2. Youth will exhibit mastery in a topic area of their choice.
- 3. Parents/guardians will be engaged with their children on setting and obtaining common education goals.

Program evaluation includes the following methods:

- 1. Spreadsheet documenting attendance, technology use, youth leadership rates, and completion of learning style assessment, field experience, portfolio, and public presentation (quantitative data).
- 2. Youth peer-assessment of leadership portfolio that assesses leadership growth, education goals, and technology literacy using established criteria (quantitative data).
- 3. Youth self-assessment on the field experience. Youth will be asked to evaluate their learning/growth (pre/ post surveys and focus groups).

Evidence of Sustainability

The school (American Indian Magnet) is fully committed to and thrilled with the program. Students who are not in the club come up to the Big Urban Woods teachers throughout the day and at school culture fairs to ask how they can become involved in 4-H. The principal of the school has agreed to allow alumni of the school to attend the program. Also, the St. Paul school district will be making significant changes, one of which will be to increase the grade

range of American Indian Magnet School to 7th grade, and then 8th grade. This will make a positive impact on the 4-H club, as it will make it easier to retain students over a longer period of time. The biggest issue in the sustainability of the program is transportation. Currently, the program is able to utilize busing through a partnership with another afterschool provider, and it is anticipated that this opportunity will continue, as will sources of funding for other aspects of the program for at least the next two years. In the mean time, both 4-H staff and school staff and volunteers are actively seeking other financial and human resources to support the program over time.

Awards/Recognition for Program

A representative from the Minnesota Department of Natural Resources (DNR) working on their 25-year Legacy Strategic Plan met with the Big Urban Woods 4-H Club. The youth drew pictures of themselves in nature illustrating what they wanted access to and shared with him the importance of the Big Urban Woods. A few weeks later on a visit to the Big Urban Woods, the youth learned that the recreation center and the Woods were in discussion for development and there would be a meeting to discuss the future of the woods. The youth wrote letters to city commissioners asking them to stop any plans of developing the Woods and outlining its importance as an educational area worthy of preserving as a natural space. The city has since designated the Big Urban Woods as an official School Forest Program, one of over a hundred recognized by the Minnesota Department of Natural Resources.

Considerations for Replication

Organic process of development: Community partners work side-by-side with 4-H staff to continually evaluate and develop the program based on the needs of the youth. In this way, the goals of both the school and 4-H maintain harmony. However, delivery of the main content is carried out by the people who are most likely to be long-term participants (e.g., community partners). In other words, the school partner is the main driver of the program, much like the youth and volunteers would be of a traditional 4-H community club. This is the key element of the sustainability of the program—the community partner has meaningful commitment to the success of the program such that it is not completely dependent on the presence of 4-H staff.

Youth Voice: Youth are involved in key decisions of the club and have increasing roles of responsibility and leadership as they grow in the program. The youth are also key players in the sustainability of the program. Our program model aims to engage youth over the longest period of time possible. Thus, alumni of the school are encouraged to return to participate in the program over time. The lower turn-over rate of participants allows for a more stable club culture that can be carried on by the most steady and consistent members.

Opportunity to master content (reflect, produce, present, connect): Part of the program model is to focus on mastery. "Mastery" means that youth have the opportunity to reflect on their learning, produce a tangible product (such as a project or presentation), gain the ability to present and articulate their learning, and find ways of connecting their interests to higher education and career opportunities. To accomplish this, all activities are presented using the experiential learning and inquiry-based approach. Also, youth are working towards the completion of projects with multiple opportunities to present them, and opportunities are woven throughout the program (campus visits, career speakers) to help youth make connections to future possibilities.




References

- Baum, S., & Payea, K. (2004). Education pays 2004: *The benefits of higher education for individuals and society.* Washington, DC: The College Board
- Bureau of Labor Statistics. 2004. *Occupational Outlook Handbook: 2004-05 Edition*. Washington, DC: U.S. Government Printing Office.
- Commission on Professionals in Science and Technology. (2005). *The status of native Americans in science and engineering*. Washington, DC: Commission on Professionals in Science and Technology.
- Dewey, J. (1938). Experience and Education. New York: Macmillan.
- Jones-DeWeever, A., & Gault, B. (2006). Resilient & reaching for more: Challenges and benefits of higher education for welfare participants and their children. Washington DC: Institute for Women's Policy Research.
- National Research Council. (2000). Inquiry and the national science education standards: A guide for teaching and learning. Washington, DC: National Academy Press.
- National Urban Indian Family Coalition. (2008). Urban Indian America: The status of American Indian and Alaska Native children and families today. Seattle, WA: National Urban Indian Family Coalition; The Annie E. Casey Foundation; National Urban Indian Family Coalition; Marguerite Casey Foundation; Americans for Indian Opportunity; National Indian Child Welfare Association. Retrieved from <u>http://www.aecf.org</u>
- National Youth Leadership Council. *K-12 Service-learning standards for quality practice*. St. Paul, MN: National Youth Leadership Council. Retrieved February 18, 2011 from <u>http://www.nylc.org/k-12-service-learning-standards-quality-practice</u>
- Partnership for 21st Century Skills. (2008). 21st Century Skills, Education & Competitiveness: A Resource and Policy Guide. Retrieved December 6, 2010 from <u>http://www.p21.org/storage/documents/21st_century_skills_education_and_competitiveness_guide.pdf</u>
- Roehlkepartain, E. C. (2007). Benefits of community-based service-learning (fact sheet). Scotts Valley, CA: National Service-Learning Clearinghouse. Retrieved February 21, 2011 from <u>http://www.servicelearning.org/</u> <u>instant_info/fact_sheets/cb_facts/benefits_cbosl</u>
- Skuza, J. (2004). Site-based youth development programs: Reaching underserved youth in targeted communities. Journal of Extension, 42(1). Retrieved at: <u>http://www.joe.org/joe/2004february/iw4.shtml</u>.
- Skuza, J. A, Russo, J. P., & Hurtado, G. A. (2009). *WeConnect: An opening to the world.* Minneapolis: Regents of the University of Minnesota.

In Partnership With





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CAUSE (College Achievement through Urban Science Exploration)

Abstract

Following a successful partnership with Henry Street Settlement (HSS) on a CYFAR project entitled Community Improvement Through Youth (CITY), Cornell University Cooperative Extension-NYC (CUCE-NYC) was invited to collaborate on the CAUSE project. HSS and CUCE-NYC successfully submitted and received funding to implement the project, selecting its first cohort of students in 2009. CAUSE's purpose is to increase teens' knowledge, interest and attitudes towards science, the environment, and community engagement.

Each CAUSE student was given the task of designing individualized research projects. Provided with hands-on advising, students were able to delve into their research questions to develop their research projects and present substantial findings. The students also received intensive college preparatory services through the Princeton Review SAT prep course, college counseling, assistance with the application and 4-H workshop sessions on public presentations and interviewing.

The program highlight came in summer 2010 as students attended the Cornell Summer College program and completed a rigorous environmental science curriculum for three college credits. Cornell University professors and graduate students also mentored them on their projects. Students presented their final research projects to an audience of their peers, advisors, parents and sponsors. The students' impressive research covered topics affecting the communities in which they live, including Metrocard and fast food restaurant recycling, eco fashion and water conservation.

Program Needs

Under representation of minorities in the Science and Engineering workforce continues to be a problem. New strategies are needed to strengthen students' science skills, interest in science and awareness of potential related careers.

Targeted Audience

Partnering with Henry Street Settlement, students were selected from low-income communities on a competitive basis based on a lengthy application process. Students were asked to demonstrate their interest in science education and their desire to incorporate science related interests into their future college plans. Seven students were selected to participate in the first program year. Parents and family members were included in the target audience and throughout the program.

Program Goals and Objectives

The long-term goal of the College Achievement through Urban Science Education (CAUSE) project is to increase the number of minority youth pursuing and succeeding in science and technology college majors and careers.



To achieve this goal, CAUSE seeks to improve the college readiness skills of minority youth from low-income communities by combining environmental studies, research, field study, and community service with intensive college preparatory services. The faculty and field based staff involved in designing the CAUSE model wish to explore whether this approach, accompanied with greater college preparation, will increase the possibility of youth pursuing science and technology studies and careers. Two other potential outcomes of the program are changes in attitudes toward science in general, and toward the environment, including awareness and behaviors.

Program Design/Curricula and Materials

The program is designed to encourage high school juniors to explore science as a career track in emerging areas such as "green" technologies, ecology, and environmental studies; and prepare them for the rigors of college and scientific research. Students design a research project based on their research and study. The program also includes a three-week residential college experience at Cornell University during the summer and culminates with a fall presentation of research project findings to parents and family members, peers, community members and sponsors.

Over the course of twelve months, the program offers:

- 1. An "Exploratory Phase" in the fall semester where students learn about research methods and ideas related to environmental studies and pick a topic of interest;
- 2. A Student Research Project in the spring that builds on the interests developed during the "exploratory" phase;
- 3. A three-week residential college experience at Cornell University during the summer through the Cornell University Summer College program, followed by fall research project presentations to parents and family, peers, community members and sponsors;
- 4. College preparatory services (provided by Princeton Review) interwoven throughout the program year to increase students' prospects for achieving academic success, guide them through the admission process, and help them gain acceptance to top colleges and universities; and
- 5. Follow-up services to maintain contact with students beyond college admission in order to support student retention and their connection to CAUSE.

Knowledge and Research Base

The 2009 National Assessment of Educational Progress report of national science scores revealed that "fewer than one-third of elementary and high school students have a solid grasp of science." The Program for International Student Assessment indicated that U.S. students trailed students in Hong Kong and Shanghai on an international science test (Banchero, 2011). These findings help provide justification for the science education approach that was taken in the CAUSE project.

In addition, the American Society for Quality (ASQ), commissioned the market research firm Harris Interactive, to conduct an online survey to uncover how well teachers transfer their knowledge and passion for science and math to their students and inspire them to pursue STEM careers (Stansbury, 2010). The survey of more than a thousand students in grades 3-12 was conducted in December 2010, and found that "Although 85% of students





said their teachers deserve at least a "B" when it comes to knowledge about science topics (55% of students gave their teachers an "A"), 63% of high school students said their teachers are not doing a good job of talking to them about engineering careers ("C" or lower), and 42% of high school students said their teachers don't ably demonstrate how science can be used in a career ("C" or lower). The study goes on to state that in some cases, a contributing factor is that some teachers aren't doing all they can to connect the dots between the math and science work that students are doing on a daily basis and how it relates to the real world and their future careers.

These studies highlight the issues that the CAUSE project is attempting to address through its project design. The project is designed to provide youth with a rigorous and stimulating science education experience driven by student interests and course requirements locally and at Cornell University.

Partners

- Cornell University Cooperative Extension NYC
- Henry Street Settlement
- Teagle Foundation
- Cornell University College of College of Agriculture & Life Sciences Department of Natural Resources
- Cornell Summer College

Funding

Teagle Foundation – College- Community Partnerships Initiative

Staffing

- Ritu Sen, Henry Street Settlement Director of Educational Services, On-site Project Leader (1st cohort)
- Matt Phifer, Henry Street Settlement Counselor, Director of Adolescent Services (1st cohort); Director of Educational Services, On-site Project Leader (2nd cohort)
- Greg Rideout, Henry Street Settlement Director of Youth Development at Henry Street Settlement
- Abby Eller, Cornell University Summer College Director for Summer Programs
- Marianne Krasny, Cornell University Chair and Faculty Advisor, Department of Natural Resources; Project Principal Investigator
- Jackie Davis-Manigaulte, CUCE NYC; Sr. Ext. Associate/Family & Youth Development Program Leader Co-Principal Investigator and Overall Project Coordinator
- Lucinda Randolph-Benjamin CUCE-NYC; Extension Associate/4-H Program Coordinator coordinates
 4-H public speaking & interview workshops
- Jason Corwin, Cornell University Graduate Student Consultant supports students during three-week course at Cornell University

- Alex Kudryavtsev, Cornell University Graduate Student Consultant conducted weekly sessions (1st cohort) and developed curriculum
- Umang Desai CAUSE Instructor (2nd cohort)

Program Delivery

Students met for 36 after-school sessions at the Henry Street Settlement throughout the program's duration. Meeting with their program's mentors, youth explored the various science topics, as well as key 4-H concepts such as public presentations and leadership. Students split their working time between group sessions, college preparations and conducting research for their individual projects. In summer 2010, students attended a three-week summer college experience at Cornell University, taking a course on environmental studies and being mentored by a Cornell graduate student. Following the summer college, students presented their year's work and research findings at a final symposium.

Recognition of Participants

Students were recognized upon completion of the three-week course at Cornell University and then at a closing ceremony in the fall of 2010, during which each student presented their research project findings. In addition, Dr. Krasny held an informal reception at her home for the students during their stay at Cornell University, which was particularly meaningful to the youth.

Program Evaluation and Outcomes/Impact

The program had a great impact on the participants and their personal and academic growth. Thirty-six afterschool sessions introduced the youth to environmental studies and research methods during which they embarked on their own research projects on topics such as water conservation, eco-fashion, Metrocard recycling, recycling in the fast food industry and environmental education. In this process, youth increased their writing, math, analytical, research and networking skills and formed friendships that will be the foundation of an alumni group to support them during their transition to college. A three-week summer college experience at Cornell University has been particularly rewarding, as participants became fully immersed in campus life and were introduced to college-level course work. The students have also become passionate ambassadors for environmental causes as a result of their research into the interrelations between local and global ecological phenomena.

The project is funded for three years. Students in the second year of the CAUSE program are designing their research projects and applying for the Cornell Summer College Program. The first year CAUSE alumni are eager to stay on board, continuing to work on their research and serving as mentors to the new CAUSE cohorts.

The CAUSE Project as a whole has been a great experience. It has been both fun and challenging at times. I have learned a lot from both Alex and Ritu and I am sure next year's participants will learn just as much. The CAUSE project has helped me increase my knowledge about the environment, through Alex and the Cornell course. It actually helped me realize how much of an interest I had in environmental studies. My re search project also helped me learn more. I had a chance to sharpen my report writing skills with the help of Alex. The CAUSE Project also helped me make new friends who will now be in my life for a very long time.





Cornell University Summer College, the other aspect of CAUSE (the first being research projects), was really fun even though it was difficult. The class taught me a lot about the history behind environmental studies. It taught me about some things I already knew and about completely new things. Summer College really showed me what it would be like living in a dorm and on a college campus. I think I am much more prepared for college than I was before.Tiquasha, 2009-2010 CAUSE Program Participant

- Tiquasha, 2009-2010 CAUSE Program Participant

Considerations for Replication

The program planners hope to create a model that will be considered for expansion and replication. We believe that CAUSE may serve as a model for other urban programs and, if so, we may consider eventually publishing the results of this project.

References

Banchero, S. (2011). Students score poorly on science test. Retrieved from <u>http://online.wsj.com/article/SB1000</u> <u>1424052748704698004576103940087329966.html</u>.

Stansbury, M. (2010). Survey: Educators aren't discussing STEM careers with students. Available online at <u>http://www.eschoolnews.com/2010/02/25/educators-not-discussing-stem-careers/</u>

In Partnership With



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Ready? Get SET to Explore Forensics!

Abstract

Ready? Get SET to Explore Forensics! is a new youth development initiative launched during the 2010 program year by the Alabama Cooperative Extension System's Urban Affairs and New Nontraditional Programs unit at Alabama A&M University (AAMU). Through implementation of the initiative, youth participants engaged in a series of short lectures and laboratory activities on forensic science at the statewide youth conference and with groups in the local urban centers.

The program engaged minority, low-income and at-risk youth in group discussions, experiments and activities to better develop their awareness and understanding of the main concepts of forensic science. More than 90% of the youth in the workshops were exposed to concepts for the first time. Previously, students could only marvel at concepts presented in television shows such as *CSI, Law & Order, Criminal Minds*, and so forth.

The June 2010 Teens and Tweens (TNT) Empowerment Conference held on the campus of AAMU in Normal, Alabama was an ideal forum. It introduced several essential elements of the 4-H SET initiative to a diverse urban audience. The conference focused primarily on forensics, and also gave insight into other SET curricula areas such as engineering, environmental science, plant science, and family and consumer science. While dialoguing with professionals at the conference's career expo, youth also learned about various careers in disciplines centered on science, engineering, and technology.

Subsequent workshops were taught at a high school in West Montgomery, Alabama to provide introductory information about the study of forensic science. Twenty-three teens learned about crime scene investigation and analyzed a crime scene from a mock robbery that took place unexpectedly at the conclusion of the workshop.

Workshops taught at the TNT conference and concepts taught in the classroom discussions introduced the applications, techniques and processes used to examine an actual crime scene, which eventually leads to solving a crime. Ready? Get SET to Explore Forensics! helps urban youth gain hands-on experience to make career aspirations and dreams more realistic and attainable.

Program Needs

It is becoming increasingly important to ensure that youth develop the skills and abilities needed to remain competitive in the 21st century. Future leaders and professionals will be those who possess the critical thinking and problem-solving skills that prepare them to respond to problems at home, on the job, and in their communities.

The launch of the 4-H SET initiative is timely, and offers support to local and state Extension educators who want to provide science outreach that includes life skills and career development. The programs offered present a supportive environment and a strong foundation for youth to realize their ambitions.



Targeted Audience

The target audience for the *Ready? Get SET to Explore Forensics!* program is new, nontraditional, underserved, un-served and at-risk youth, ages 9-18. This initiative is expected to reach urban youth in the nine Urban Centers throughout the state.

As with all urban Extension programs, agents are charged with the task of implementing programs to educate youth from varied socioeconomic backgrounds. Several youth participants in the SET initiative were residents of the housing authority, a children's home, and relative caregiver households.

The local forensic science workshops were taught in a traditional school setting with students attending George Washington Carver High School in West Montgomery, Alabama. The area in the city is a growing urban region where there are high rates of substance abuse in the community.

The greater percentage of the West Montgomery population is low income and has low educational attainment. Thirty-six percent of this population is below poverty level. This is significantly higher city overall rate of 17.7%. The median household income in 2009 for West Montgomery was \$33,359, and the city of Montgomery as a whole was \$40,568.

Program Goals and Objectives

The project goals and objectives were to: (a) enhance the understanding of scientific concepts in science, engineering and technology; (b) facilitate the application of scientific knowledge to daily living; and (c) foster the development of proficiency in SET skills that encourage scientific pursuits for personal and career development.

The overall 4-H SET initiative was developed to:

- Increase knowledge, skills, and competencies and improve the attitudes of youth in science, engineering and technology.
- Increase the knowledge, skills, competencies and comfort level of youth and adult 4-H volunteers and staff for offering hands-on, experientially-based 4-H SET learning experiences to youth.
- Work with Urban 4-H/Youth Development volunteers and staff, land-grant college and university faculty, SET content experts and other partners (museums, SET organizations, SET associations, industries, foundations, etc.).

The urban Extension team used the forensics discipline to hone science and laboratory skills. Participants were:

- Introduced to forensic science.
- Shown how science is applied to police work and crime investigations.
- Introduced to the use and care of microscopes.
- Provided an opportunity to apply problem-solving techniques using a microscope.
- Allowed to explore career opportunities in science, engineering and technology.

Program Design/Curricula and Materials

Living in the technology and information age, the approach to reaching youth needs to be more innovative and appealing. Youth are taking notice and interest in the growing number of police procedural television series like *The First 48, CSI Miami/New York, Criminal Minds* and *Law and Order*. Youth are fascinated with the process of forensic investigation. Therefore, Extension introduced the study of forensic sciences to teach the core principles and elements of crime scene investigation.

The discipline of forensic science connects youth to the science of crime scene investigation. It reinforces the idea that science is everywhere, from growing foods to curing diseases and solving crimes. Also, the initiative helps youth build confidence in their abilities, develop problem-solving skills, and gives them the opportunity to interact with leaders and professionals from SET industries.

There was no specific curriculum used during the TNT EmPOWERment program; however, expert volunteers conducted hands-on workshops to teach science concepts. Curriculum used for the local workshops included both online resources, in particular The Science Spot and activities from A Crime, A Clue and Biotechnology published by the Office of Biotechnology and Extension Youth and 4-H of Iowa State University.

Knowledge and Research Base

The field of science, engineering and technology is becoming increasingly essential for economic stability. The United States is dependent on science and technological advances.

According to the National Association for Gifted Children, all children, minority students in particular, need to know the importance of science and mathematics in their daily lives. Knowledge of these subjects helps them to develop intellectually and socially. Science is a way of thinking, a way of understanding the world. Minority students need to understand that early involvement with the substance of science and mathematics can open gates into all the domains of knowledge and employment. Science and mathematics are shaping the future; studying these subjects prepares youth for a place in that future.

Partners

The primary partner for the 4-H SET initiative through the Alabama Cooperative Extension System's Urban Affairs New and Nontraditional Programs unit is the land-grant institution Alabama A&M University. Several educational departments have joined Extension in conducting workshops and disseminating information to youth. The faculty and staff assisting with this project represent the Departments of Physics, Natural Resources and Environmental Sciences, and Family and Consumer Sciences.

Other contributing agencies include the Marshall Space Flight Center of the National Aeronautics and Space Administration, the Unmanned Aircraft System, the Defense Intelligence Agency, the Alabama Department of Forensic Science, and Alabama Science in Motion.

Funding

Youth participants were charged a registration fee to attend the TNT EmPOWERment Conference, and agents used program development funds to implement forensics workshops. In some cases, regional agents procured funds

ERATIVE EXTENSION SYSTEM

EXPLORE

NSIC SCIENCE



from community leaders to assist students with registration fees and transportation. Urban Regional Extension Agents (UREAs) host local forensics workshops utilizing allocated program funds and in-kind contributions.

Staffing

"*Ready? Get SET to Explore Forensics!*" is delivered as a collaborative effort among Extension staff at AAMU, UREAs, volunteers, and business partners. The TNT EmPOWERment Conference was created and is organized under the leadership of Extension Youth Development and Volunteerism specialist, Kimberly Burgess-Neloms. She works closely with agents to plan and implement the event.

There are UREAs in six of Alabama's Metropolitan Statistical Areas (MSAs) who currently conduct youth programs. Two of the seven UREAs are 100% committed to youth development programming. The remaining five UREAs have split appointments, with 50% of their time committed to youth development. UREAs recruit competent and confident volunteers who are committed to the delivery and evaluation of all areas of their programs.

Program Delivery

More than 160 youth and adults from Colbert, Lauderdale, Limestone, Madison, Mobile, Tuscaloosa, Montgomery, Lawrence and Morgan counties in Alabama participated in the youth conference, which was packed with educational and fun-filled activities. The conference theme was "Exploring Health and Fitness, Science, Engineering and Technology," and it opened with the Science, Engineering and Technology Expo. The conference highlighted a wide vary of SET related careers:

- The Marshall Space Flight Center in Huntsville provided information to encourage young people to consider careers in engineering and the aerospace industry. Their goal is to develop the next generation of explorers.
- Inventor, Dr. Frank Archer III, displayed his microwave autonomous copter system. His invention is the world's first unmanned aircraft system to be equipped and flown successfully with a microwave radiometer sensor. Dr. Archer is the interim director for Institutional Planning, Research and Evaluation at AAMU.
- Nutrition and Hospitality Management Program in AAMU's Department of Family and Consumer Science shared career information designed for students who possess a strong interest in the sociological, psychological, physiological, and economic aspects of food as it relates to nutritional status and world hunger. The program provides a broad education in the science of nutrition and preparation of food as related to lifestyles, cultures, and health. The program enables students to develop competencies in the ecological, socio-psychological, and economic aspects of apparel and interior design, production, distribution, and consumption.
- The Apparel, Merchandising and Design program, also in AAMU's Department of Family and Consumer Science, provided a general understanding of textiles, clothing, fashion, and related areas, while offering diversification through concentrations in fashion merchandising, fashion design, and interior design.
- Mr. Larry M. Davis, chief of the Applications Software Division represented the Office for Analytical Systems within the Defense Intelligence Agency's Missile and Space Intelligence Center (DIA/MSIC). DIA/ MSIC shared their vision of the integration of highly skilled intelligence professionals with leading edge technology to discover information and create knowledge that provides warning, identifies opportunities, and delivers overwhelming advantage to our defense planners and national security policymakers.

• Dr. Colmore S. Christian, assistant professor in the Forestry, Ecology, and Wildlife Program in AAMU's Department of Natural Resources and Environmental Sciences, spoke with students about the fields of forest management, forest sciences, wildlife biology, fisheries, and remote sensing and Geographic Information Systems. Dr. Christian's research initiatives focus on small-and medium-sized private sector outdoor recreation enterprises, the application of agroforestry strategies in the wildland-urban interface, and on visitor use patterns on public lands in Alabama.

Conference workshops included an introductory study of forensic science and engineering. SET sessions presented included:

DNA Extraction
 Fingerprint Analysis
 Forensic Science Defined

The workshops provided youth participants with the opportunity to get a closer look at and understanding of concepts by actively engaging in hands-on activities. Workshops were taught by Dr. Malinda Westbrook, Assistant Professor of Chemistry at AAMU; Jennifer Hutchinson, Biology Specialist with Alabama Science in Motion; and Dr. Lonnie Ginsberg, Laboratory Director for the Alabama Department of Forensic Science in Huntsville, Alabama.

Additionally, subsequent workshops were offered by UREAs focusing on problem-solving and analytical thinking through crime scene investigations. Youth were taught crime scene fundamentals, including CSI terminology, types of evidence, crime scene personnel, and protocol for investigations.

Youth studied testimonial evidence, followed by a crime scene challenge (mock crime). In brief, testimonial evidence discussed eyewitness accounts, reviewing factors that affect a person's memory and ability to identify a suspect. The workshop on the types of evidence concluded with Roosevelt Robinson, UREA in Montgomery. Students were challenged with examining the scene in order to solve the crime.

Recognition of Participants

The TNT EmPOWERment Conference concluded with a semi-formal awards breakfast for staff, students, and volunteers. They were recognized for their active program participation in the conference and contributions to workshops and activities. During the awards breakfast, youth were commended on having chosen to learn more about the disciplines of 4-H SET and challenged to continue their career pursuits.

Exhibitors and presenters were thanked following their workshop. Additionally, each volunteer, teen teacher, exhibitor, and presenter will be invited to the state level volunteer appreciation program.

Program Evaluation and Outcomes/Impact

As a result of participation in the Extension Team Project, participants were to:

- Enhance the understanding of SET concepts,
- Apply scientific knowledge to daily living, and
- Develop proficiency in skills that encourage scientific pursuits for personal and career development.

The state initiative evaluation assessments are required to be completed before and after programs (pre- and post tests). Evaluations reflect knowledge gained by program participants.





The classroom learning workshops evaluation results showed youth increased knowledge in the study of evidence, crime scene protocol, and factors that affect a person's ability to identify a suspect.

Evidence of Sustainability

The initiative has strong state level administrative support and effective collaborations with diverse organizations and agencies in science career fields. AAMU's faculty in the Schools of Agriculture and Environmental Sciences and Engineering and Technology continues to partner with urban youth development to enhance programming.

Awards or Other Recognition Received for Program

The TNT EmPOWERment Conference was featured in an article for the Alabama Cooperative Extension System's News Line, which is an online communication site that highlights ACES programs.

Considerations for Replication

Securing a funding source will allow the conference to be more affordable for the target audience. Including a tour of local/regional forensic laboratories or colleges with related coursework would enhance the program. At one time, the Alabama Department of Forensic Science allowed youth tours of the facility but has recently stopped due to potential contamination issues (if a participant sneezes it introduces foreign DNA into the laboratory). However, analysts or scientists are willing to make presentations at an off-site classroom.

Youth development staff wanting to offer programs in the forensics might consider hosting a summer day camp with parks and recreation. Potential speakers/presenters could include professionals who work in a forensic science field, such as the coroner, law enforcement officials, medical examiners, and so forth.

References

- ACES News Line. (2010, Aug 17). 2010 TNT Conference Highlights. Retrieved from <u>https://sites.aces.edu/group/comm/newsline/Lists/Posts/Post.aspx?ID=204</u>
- Alabama Department of Forensics Science. (2011, Feb 1). Crime Scene Examinations. Retrieved from <u>http://</u> <u>www.adfs.alabama.gov/</u>

City-Data.com (2010). West Montgomery.

Clark, J. (1999). Minorities in Science and Math. Retrieved from <u>http://www.ericdigests.org/2000-2/minorities.htm</u>

The Science Spot. Forensic Science Lesson Plans. Retrieved from http://sciencespot.net/Pages/classforsci.html

In Partnership With





Resources

General

Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads – this report by the National Academy of Sciences focuses on the critical lack of minorities in STEM-related careers and offers concrete ways to address this issue. Available at <u>http://www.nap.edu/catalog.php?record_id=12984</u>.

Learning Science in Informal Environments: People, Places, and Pursuits – an invaluable guide from the National Research Council for program and exhibit designers, evaluators, and staff of science-rich informal learning institutions and community-based organizations, scientists interested in educational outreach, federal science agency education staff, and K-12 science educators. Contributors have experience in a range of settings – museums, afterschool programs, science and technology centers, media enterprises, aquariums, zoos, state parks, and botanical gardens. Available at <u>http://www.nap.edu/catalog.php?record_id=12190</u>.

Promising Practices in Positive Youth Development with Immigrants and Refugees – immigrant and refugee youth benefit from community-based and afterschool programs for many of the same reasons as their non-immigrant counterparts. However, their unique strengths and needs are important for programs to consider when targeting these youth. Based on an analysis of over 60 programs, this article provides seven principles of effective positive youth development programs, as well as "promising practices" from across the country. Available at <u>http://www.tpronline.org/article.cfm/PYD_with_Immigrants_and_Refugees</u>.

Surrounded by Science: Learning Science in Informal Environments – based on the National Research Council study, Learning Science in *Informal Environments: People, Places, and Pursuits,* this book is a tool that provides case studies, illustrative examples, and probing questions for practitioners – making valuable research accessible to those working in informal science: educators, museum professionals, university faculty, youth leaders, media specialists, publishers, broadcast journalists, and many others. Available at <u>http://www.nap.edu/catalog.php?record_id=12614</u>.

What Works for African American Children and Adolescents: Lessons from Experimental Evaluations of Programs and Interventions – a Child Trends brief reviews rigorous evaluations of out-of-school programs serving African American children to identify programs that work, as well as those that do not, and the intervention strategies that contribute to program success. Available at <u>http://www.childtrends.org/Files/Child_Trends-2011_02_01_</u> <u>RB_WW4AAChildren.pdf</u>.

What Works for Latino/Hispanic Children and Adolescents: Lessons from Experimental Evaluations of Programs and Interventions – a Child Trends brief reviews rigorous evaluations of out-of-school programs serving Latino children to identify programs that work, as well as those that do not, and the intervention strategies that contribute to program success. Available at <u>http://www.childtrends.org/Files/Child_Trends-2011_02_01_</u> <u>RB_WW4LatinoChildren.pdf</u>.





4-H SCIENCE CORE PRINCIPLES AND PROGRAM DESIGN

4-H Science Program Design – 4-H Science Checklist

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery, and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support 4-H Science programs. Includes the 4-H Science Checklist, 4-H Science Competencies, and Experiential and Inquiry-Based Learning Methods in 4-H Science. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Inquiry Based Learning Approaches

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support their 4-H Science programs. Includes a section on *Experiential and Inquiry-Based Methods in 4-H Science and Inquiry–Theory to Practice*. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Exploratorium's Institute for Inquiry[®] – workshops and facilitator guides (free downloads) for those providing professional development in the pedagogy and practice of science inquiry. Available at <u>http://www.explorato-rium.edu/ifi/workshops/index.html</u>. Introductory information on science inquiry is available at <u>http://www.exploratorium.edu/ifi/about/philosophy.html</u> - including free downloads of *What is Inquiry, Pathways to Learning, Inquiry Structure, and Inquiry Descriptions*.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>.

Providing Youth Authentic Opportunities to Practice and Share 4-H Science Abilities

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery, and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Service Learning Curriculum – includes curriculum information, additional resources, and a link to purchase the three-book service-learning series. Available at <u>http://new.4-hcurriculum.org/projects/servicelearning/</u>.

4-H There's No New Water! Curriculum Page – includes information and additional resources on service-learning and Youth-Adult Partnerships. Available at <u>http://www.4-h.org/resource-library/curriculum/4-h-theres-no-new-water/service-learning/</u>.

Citizen Scientist Opportunities – the following websites are representative of the increasing opportunities for youth and others to participate as citizen scientists – recording and sharing data with the greater scientific community. A database of Citizen Scientist opportunities, searchable by subject, is available at <u>http://science-forcitizens.net/</u>.

Community Collaborative Rain, Hail and Snow Network - <u>http://cocorahs.org/</u>. Cornell Lab of Ornithology - <u>http://www.birds.cornell.edu/citsci/</u>. NASA Science - <u>http://science.nasa.gov/citizen-scientists/</u>. Project BudBurst - http://www.neoninc.org/budburst/index.php.

National Service-Learning Clearinghouse – a wealth of information and resources on service-learning and exemplary service-learning programs. Includes professional development (conferences and webinars) and grant opportunities. Available at <u>http://www.servicelearning.org/</u>. A site designed for youth is available at <u>http://www.servicelearning.org/</u>.

School Gardening: Best Practices – a guide developed as part of the Louisiana 4-H Seeds of Service School Gardening Program with suggested practices for starting and maintaining youth gardening programs. Available at <u>http://www.ext.colostate.edu/4_h/school-garden.pdf</u>.

Training Others to Deliver High Quality Science Programming

4-H Science 101 – this training guide provides four hours of activities that will help introduce your staff and participants to the development, delivery and assessment of 4-H Science programs. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support their 4-H Science programs. Includes sections on the 4-H Science Checklist, 4-H Science Competencies, Experiential and Inquiry-Based Learning Methods in 4-H Science, Recruiting and Developing 4-H Science Content Rich Volunteers, Recruiting and Developing Traditional Volunteers in 4-H Science, Tools and Resources for 4-H Science Professional Development, and Communities of Practice. Available at <u>http://www.4-h.org/resource-library/professional-development-learning/science-training-guides-resources/</u>.

Afterschool Training Toolkit – research-based practices, sample lessons, video examples, and resources to support academic enrichment in afterschool settings. Available at <u>http://www.sedl.org/afterschool/toolkits/index.html</u>.

Guide to Professional Development of Out-of-School Science Activity Leaders – the tools provided here describe a model for how to engage OST leaders in professional develoment around STEM activities for youth. It describes OST programming where science is complementary to what happens in school, and the activities and projects used with youth are accessible to most program leaders. Available at <u>http://ltd.edc.org/resource-library/guide-professional-development-out-school-activity-leaders</u>.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>. The





NPASS2 Afterschool Site Observation Form and a Science Trainer Reflection Form are available at <u>http://npass2.</u> <u>edc.org/forms-and-tools-data-collection-and-feedback</u>.

PARTNERSHIPS, RESOURCE DEVELOPMENT, PROGRAM GROWTH AND SUSTAINABILITY

Partnering with Afterschool Providers

21st Century Community Learning Centers – this program, through the Department of Education, supports the creation of community learning centers that provide academic enrichment opportunities during non-school hours for children, particularly students who attend high-poverty and low-performing schools. The program helps students meet state and local student standards in core academic subjects. For more information, including current grantees in your state, visit <u>http://www2.ed.gov/programs/21stcclc/index.html</u>.

Afterschool Alliance STEM Resources – the Afterschool Alliance is the nation's leading voice for afterschool and is dedicated to raising awareness of the importance of afterschool programs and advocating for more afterschool investments. The Afterschool Alliance works with policymakers across the country. Today the Afterschool Alliance boasts more than 25,000 afterschool program partners and their publications reach more than 65,000 individuals every month. STEM info and resources are available at <u>http://afterschoolalliance.org/</u><u>STEM.cfm</u>.

Coalition for Science After School – the Coalition is a strategic alliance of individuals and organizations from STEM education, youth development, and programs held outside of school time. Their mission is to coordinate and mobilize community stakeholders to strengthen and expand opportunities that engage young people in afterschool science. A directory of members, and several resources are available at <u>http://www.afterschoolscience.org/</u>.

Frontiers in Urban Science Exploration Resource Guide – a resource guide offering strategies to advance science education in afterschool programs. Available at <u>http://www.tascorp.org/content/document/detail/3040/</u>.

Harvard Family Research Project OST Resources and Tools – since 1983, the Harvard Family Research Project (HFRP) has helped stakeholders develop and evaluate strategies to promote the well being of children, youth, families, and their communities. Out-of-school time programming is one of three focus areas, and a wealth of OST resources and tools are available at <u>http://www.hfrp.org/out-of-school-time</u>.

NPASS2 – **National Partnerships for After School Science** – includes best practices for afterschool science for science project leaders along with many other informal science education resources and professional development tools for OST. NPASS2 is led by the Center for Science Education at EDC. Available at <u>http://npass2.edc.org/</u>.

Science in Afterschool Literature Review – a review of afterschool science education practices (including inquiry and project based learning) and afterschool science programs developed for The National Partnership for Quality Afterschool Learning. Available at: <u>http://www.sedl.org/afterschool/toolkits/science/pdf/SERVE%20Science%20</u> in%20Afterschool%20Review.pdf.

Partnering with Summer Program Providers

Building Quality in Summer Learning Programs: Approaches and Recommendations – identifies the different settings in which summer programs for disadvantaged youth most commonly take place – schools, parks and recreation departments, community- and faith-based organizations, and child-care programs – and examines the limitations and opportunities presented by each in building better programming. Available at <u>http://www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAreasofFocus/Out-Of-SchoolLearning/Documents/Building-Quality-in-Summer-Learning-Programs.pdf.</u>

Effective and Promising Summer Learning Programs and Approaches for Economically-Disadvantaged Children and Youth – summarizes findings from an extensive literature review that was conducted to identify the most promising models and approaches for meeting the needs of low-income children, youth, and families during the summer months. Available at <u>http://www.wallacefoundation.org/knowledge-center/summer-andextended-learning-time/summer-learning/Documents/Effective-and-Promising-Summer-Learning-Programs.pdf.</u>

National Summer Learning Association – the National Summer Learning Association serves as a network hub for thousands of summer learning program providers and stakeholders across the country, providing tools, resources, and expertise to improve program quality, generate support, and increase youth access and participation. The association offers professional development, quality assessment and evaluation, and best practices dissemination. Available at <u>http://www.summerlearning.org/</u>.

Partnering with City Government and City Parks and Recreation

National Recreation and Park Association - NRPA is the leading advocacy organization dedicated to the advancement of public parks and recreation opportunities, http://www.nrpa.org/. National and state affiliates of NRPA are available at <u>http://www.nrpa.org/stateassociations/</u>.

National League of Cities' Institute for Youth, Education and Families - includes information on their afterschool and youth development initiatives. The Institute, a special entity within the National League of Cities (NLC), helps municipal leaders take action on behalf of the children, youth, and families in their communities. Available at <u>http://www.nlc.org/iyef/</u>. Several relevant publications may be found at <u>http://www.nlc.org/find-city-solutions/</u> iyef/afterschool (under tools and resources tab) and <u>http://www.nlc.org/find-city-solutions/iyef/youth-civic-en-</u> gagement (under tools and resources tab).

Partnering with Colleges and Universities and Campus-Based Scientists

Educational Opportunity Fund (EOF) – The New Jersey EOF is one of the nation's most comprehensive and successful state-supported efforts to provide access to higher education for economically and educationally disadvantaged students. The EOF assists low-income residents who are capable and motivated but lack adequate preparation for college study. Helping students succeed and graduate, the EOF supports a wide array of campus-based outreach and support services at institutions. Available at <u>http://www.nj.gov/highereducation/EOF/</u>.





Partnering with Science Centers and Museums

Association of Science-Technology Centers – an organization of science centers and museums dedicated to furthering public engagement with science among increasingly diverse audiences. For informal learning publications and professional development opportunities, or to find a science center near you, visit http://www.astc.org/index.htm. For information specific to youth involvement in science centers, see <u>http://www.astc.org/</u><u>resource/youth/index.htm</u>.

Designing Partnerships Between Science Centers and After-School Programs: Lessons from Design It! Engineering in After School Programs – this document introduces informal science educators to a new partnership model based on lessons learned during a 3-year national pilot project to support collaboration between six urban science centers and over 30 community-based afterschool programs. The collaboration tested and refined an innovative curriculum challenging children to building working models of small functional machines and toys and to practice crucial elements of the design process. Available at <u>http://www.eric.ed.gov/</u>.

State Level Practices to Support Urban Programming

Urban Extension Conference - this bi-annual conference, sponsored by the north central region, targets Cooperative Extension staff who work in urban communities. Participants build strategic partnerships, identify strategies to enhance the resource base for urban programming, capture best practices of urban Extension, and explore emerging issues. Available at <u>http://www.dce.k-state.edu/conf/urban-extension/</u>.

STAFFING, RECOGNITION, AND MARKETING

Staffing with Content Rich Volunteers

4-H Science Professional Development Toolkit – an online set of resources and training activities to be used by youth development professionals and volunteers to prepare them to support their 4-H Science programs. Includes a section on Recruiting and Developing 4-H Science Content Rich Volunteers. Available at <u>http://www.4-h.org/Professional-Development/Content/Science/Implementation/Recruiting-and-Developing-Volunteers/</u>.

Staffing with AmeriCorps Members

AmeriCorps Program – to learn more about the AmeriCorps program, current grantees (potential partners), or to apply, visit <u>www.americorps.gov</u>.

Staffing with Teenagers and Teens as Cross-Age Teachers

Creating Youth-Adult Partnerships: Training Curricula for Youth, Adults and Youth-Adult Teams – leads youth and adults new to group facilitation and to youth-adult partnerships through a 6-8 hour training that builds their capacity to work together in true collaboration. The 156-page step-by-step curriculum includes detailed scripts, activities, and evaluation materials. Available at <u>http://www.theinnovationcenter.org/store/87</u>.



Engaging Older Youth: Program and City-Level Strategies to Support Sustained Participation in Out-of-School Time – includes information on keeping youth engaged over time, developmental differences between middle school and high school programs, city-level supports to promote and sustain participation, and key findings and implications. Available at <u>http://www.wallacefoundation.org/KnowledgeCenter/KnowledgeTopics/CurrentAr-easofFocus/Out-Of-SchoolLearning/Pages/engaging-older-youth-city-level-strategies-support-sustained-participation-out-of-school-time.aspx.</u>

Teens as Volunteer Leaders: Recruiting and Training Teens to Work with Younger Youth in After-School Programs – includes information on the elements of teens as volunteer leaders, teen recruitment, mentor and afterschool program recruitment, project orientation, training, recognizing program participants, and promoting 4-H afterschool. One of several 4-H Afterschool Resource Guides available at <u>http://www.scribd.com/</u> <u>doc/102794559/As-TeenVolunteers-1</u>.

Recognizing Youth and Showcasing Programmatic Efforts

National 4-H Recognition Model – the model, including five types of recognition and suggestions for applying the model, is available at <u>http://www.national4-Hheadquarters.gov/library/4h_recmo.pdf</u>.

Marketing and Branding 4-H Science in Urban Communities

4-H Name and Emblem – a fact sheet on the proper use of the 4-H Name and Emblem. Available at <u>http://www.</u> <u>national4-hheadquarters.gov/library/4-Hguidelines-v4-26-04.pdf</u>.

4-H National Youth Science Day – site includes a three-month planning timeline, customizable flyers, newspaper and web banner ads and even an NYSD graphic for your Facebook page. Get started with the 4-H National Youth Science Day event planning timeline, and a brief overview of how to make the most of the materials in the kit. Available at <u>http://www.4-h.org/4-h-national-youth-science-day/nysdhome.aspx</u>.

4-H Promotional Toolkit – an online set of resources including the 4-H Science PSA Campaign (One Million New Scientists. One Million New Ideas.[™]). Available at <u>http://www.4-h.org/resource-library/promotional-toolkits/</u>.

4-H Science YEAK and Implementation Study Brochures – Available at the 4-H Science Research page <u>http://www.4-h.org/about/youth-development-research/science-program-research/</u>.

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