

**V(A). Planned Program (Summary)**

**Program # 10**

**1. Name of the Planned Program**

4-H Youth Development

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
724	Healthy Lifestyle	10%		0%	
806	Youth Development	90%		0%	
	<b>Total</b>	100%		0%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	38.0	0.0	0.0	0.0
Actual Paid Professional	0.0	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2233585	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2233585	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
11716951	0	0	0

**V(D). Planned Program (Activity)**

1. Brief description of the Activity

**4-H Club** enrollment in Illinois totaled 22,700. More than 150,000 young people were involved in some type of 4-H program such as after-school group programs, conferences, and camps. Additional Metro Educator positions were established in areas of 100,000 and now include 13 educators who are creating opportunities for younger youth to become involved in sustained science and/or gardening opportunities while helping older youth develop civic engagement and leadership skills. Educational priorities for all 4-H delivery systems focused on: [1] Learning employment skills; [2] Experiencing healthy relationships; [3] Becoming physically fit; [4] Thinking green; and [5] Engaging in science.

Emphasis on engaging youth in science included 37 groups reaching 1,400 youth who participated in the **4-H National Youth Science Day**. They completed the **Maps and Apps Challenge** to create a design and map of their ideal park and solve a community problem using GIS mapping with the help of **Youth Science Ambassadors** and adults. The 4-H robotics project involvement nearly doubled in enrollment again this year with 3,467 youth enrolled in one of three project levels. Forty-two teams participated in the fifth annual Illinois 4-H **State 4-H Robotics Team Competition**. **4-H Tech Wizards**, designed to establish mentoring programs for at-risk, underserved youth in an after-school setting, continued to engage youth participants at three sites this past year. State and national partners played an important role in providing grants to support these science experiences and opportunities for awarding college scholarships.

Cook County continued to offer youth science classes through its **Mobile Science Laboratory**. The **4-H Incubation and Embryology** program engaged youth in experiencing hands-on science concepts while caring for and observing the growth process of chicken embryos, **Science Siesta**, designed for girls in grades 4 through 6, introduced them to fun hands-on science activities and career opportunities. The program aims to dispel myths that science is too difficult, not fun, and more suited to males. The **I Think Green** curriculum was developed by 4-H and horticulture Extension specialists to engage 3<sup>rd</sup> through 5<sup>th</sup> grade youth in investigating how living things interact with each other and with their environment [also see Natural Resources and the Environment planned program]. New this year, the **4-H Citizen Scientist** program provided junior and senior high youth opportunities to extend learning into the world of hands-on research to observe and record information from a stream site close to their home community and then contributed to the Illinois River Watch data collection site.

Several activities and programs focused on youth career exploration and workforce preparation. **Illinois Summer Academies** three-day conferences were held on the University of Illinois campus and provided high school teens with opportunities to explore a college campus as well as hands-on workshops on potential careers in 4-H science or leadership development training. **Welcome to the Real World**, a multi-disciplinary curriculum and simulation that allows youth from 12 to 18 to explore careers and money management [balancing income and expenses] in adult life, was on-going [also see Agricultural and Consumer Economics planned program]. A grant-funded national applied research project, **Health Jam**, involved more than 650 youth in two-day camps that allowed them to explore health careers and to learn about pursuing a healthy lifestyle in keeping their bodies fit [also see Human Development and Family Wellbeing planned program].

Building youth leadership skills is both a national and Illinois area of focus. At the state level opportunities and training were provided for Youth Leadership Team members to plan and conduct conferences and to articulate the impact of the 4-H program to legislators. Youth participants in **Speaking for Illinois 4-H** also demonstrated their skills in articulating the impact of the 4-H program to legislators. Illinois 4-H is also focusing on developing teens as teachers. More than 100 **Youth Science Ambassadors** were involved in conducting the **Maps and Apps Challenge** and some 160 are involved in other teaching opportunities that contributed greatly to the success of reaching new and diverse audiences.

Volunteers are key to the delivery of 4-H Youth Development programs and are instrumental as caring adults who create an environment that is a critical element of positive youth development. This past

year 20,067 volunteers gave time and talent to the 4-H Youth Development program in Illinois with more than 4,200 serving as club leaders. Leaders had instant access to seven online courses to help them carry out their role. In addition to a basic course orienting new volunteers, other course topics include an overnight chaperone orientation, child protection, parliamentary procedure, working with committees, club program planning, and public presentations. Illinois volunteers also participated in the **North Central 4-H Leaders Volunteer Forum** held via distance technology and hosted by local Extension offices. Leaders were able to interact with experts from various states to gather information and ideas on working with parents, engaging older youth, using technology, and exploring science.

**2. Brief description of the target audience**

Youth between the ages of 8 and 19 including children of military families, volunteers who work with youth, teachers, parents, and community members.

**3. How was eXtension used?**

One Extension staff member is a member of the Military Families eXtension Community of Practice.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	181819	0	333462	435580

**2. Number of Patent Applications Submitted (Standard Research Output)**

**Patent Applications Submitted**

Year: 2013  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
<b>Actual</b>	0	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- {No Data Entered}

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increased Knowledge About Science And Health Careers
2	Increased Knowledge Of Positive Youth Development
3	Pursuit Of Higher Education Including Science, Engineering, And Technology Careers
4	Number Of 4-H Youth Applying Leadership Skills
5	Presence Of 4-H Club Experiences That Foster Positive Youth Development
6	Increased Knowledge Of The Costs Of Independent Living
7	Number Of Youth Who Indicate Increased Knowledge Of Science, Engineering And Technology

## **Outcome #1**

### **1. Outcome Measures**

Increased Knowledge About Science And Health Careers

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	385

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Reports of college degrees awarded, media reports, and business and industry leaders' expressed concerns about the declining interest of youth in science, engineering, and technology and have identified this decline as a situation that may undermine the country's standard of living and global position of leadership.

#### **What has been done**

University of Illinois Extension 4-H conducted Health Jam for more than 650 youth in seven counties using a two-day camp format and an eight-week Walk Across Illinois activity that involved tracking daily and weekly steps as a team. During the camps, the youth learned how to keep their bodies healthy and fit and explored health professions. Science Siesta, designed for girls in grades 4 through 6 also introduced them to fun hands-on science activities and career opportunities.

#### **Results**

Using a pre- and post-test evaluation format, 359 youth [55% of the 654 Health Jam youth respondents] were able to list at least one additional health profession on the post-test. A paired-samples t-test analysis indicated a statistically significant increase in the number of health professions participants listed on the post-test as compared to the pre-test in all but two of the nine locations. Students also demonstrated knowledge gained in responding to multiple-choice questions. For example, at one location 52% of the participants learned that emergency nurses' work involves scientific inquiry, detective work, high technology, and compassion and caring. Pre-tests compared to post-test completed by girls who participated in the Science Siesta program indicated that 26 [60%] learned about what a genetic counselor does.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
724	Healthy Lifestyle
806	Youth Development

### **Outcome #2**

#### **1. Outcome Measures**

Increased Knowledge Of Positive Youth Development

Not Reporting on this Outcome Measure

### **Outcome #3**

#### **1. Outcome Measures**

Pursuit Of Higher Education Including Science, Engineering, And Technology Careers

Not Reporting on this Outcome Measure

### **Outcome #4**

#### **1. Outcome Measures**

Number Of 4-H Youth Applying Leadership Skills

Not Reporting on this Outcome Measure

### **Outcome #5**

#### **1. Outcome Measures**

Presence Of 4-H Club Experiences That Foster Positive Youth Development

Not Reporting on this Outcome Measure

### **Outcome #6**

#### **1. Outcome Measures**

Increased Knowledge Of The Costs Of Independent Living

Not Reporting on this Outcome Measure

## **Outcome #7**

### **1. Outcome Measures**

Number Of Youth Who Indicate Increased Knowledge Of Science, Engineering And Technology

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	9255

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Business leaders in Illinois are struggling to find the science, technology, engineering and mathematics [STEM] talent they need to stay competitive. Students need more exposure to challenging and engaging content. For more information see:  
[http://vitalsigns.changetheequation.org/images/vs\\_newsletter/illinois.pdf](http://vitalsigns.changetheequation.org/images/vs_newsletter/illinois.pdf).

#### **What has been done**

The 4-H Incubation and Embryology project has been carried out in elementary school classrooms for over two decades using hands-on science concepts in caring for and observing the growth process of chicken embryos from the inception of the eggs through hatching of chicks. The majority of youth participants were in K-2 classrooms, but middle school youth were also engaged in the activities this past year. Curriculum development and training was provided by the Extension poultry faculty member and local Extension Educators. Evaluations were collected from 311 teachers in nine counties in Northeastern Illinois to determine their perceptions of impact related to their 11,368 students' science ability gains.

Now in its eleventh year, Science Siesta provides girls in grades 4-6 with the opportunity to meet and interact with female scientists, conduct fun hands-on science activities in a laboratory setting, and participate in activities in stimulating science-centered environments. This past year 97 girls participated in one of the following three tracks: Space Geologist, Genetic Counselor, or Rain Forest Ecologist.

In addition, a questionnaire was distributed and collected from 292 youth participants in robotics clubs this past year that included fourteen questions related to interest in science now and in the future and in designing robots. Youth were asked to respond to the questions using a 1-4 scale with 1 = Strongly disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly agree.

### Results

Using a scale of 1-4 [1 = Not at all, 2 = Sometimes, 3 = Usually, and 4 = Always], grades K-2 teachers were asked to rate their students' level [as a group] with respect to five [5] science abilities, and grades 3-12 teachers were to rate their students' level on ten [10] science abilities after participating in the multi-week 4-H Incubation and Embryology project. Observed increases in at least one of these skills were reported by 80% of the 238 teachers who answered these questions [see Evaluation section of this planned program for more information].

Of the 87 participants who completed both the pre-test and post-test evaluation at the end of Science Siesta, 26 [31%] learned the steps of the scientific method and eighteen [21%] learned why it is important to use the scientific method. Of the 24 girls who participated in the Space Geologist track, 22 [92%] learned about meteorites and/or tools a geologist uses. Of the 23 girls who participated in the Genetic Counselor track, 19 [83%] learned about genes and/or what a genetic counselor does as part of their job. Of the 43 girls who participated in the Rain Forest Ecologist track, 34 [79%] learned about rain forest nuts and/or learned how certain frogs improve their survival in the rain forest. In summary, 75 of the 85 girls who completed the evaluation were able to answer at least one question correctly at the end of the program that they had answered incorrectly on the pre-test.

Ninety percent [280] of the 292 youth who responded to the questionnaire distributed and collected at robotics club events indicated that they agree or strongly agree that they: [1] Learned to test and improve robot designs; [2] Learned to think about different options to identify the best robot solutions; and [3] Came up with ideas used in robot designs. In addition, with respect to other findings related to science, 95% affirmed that they like science and want to learn more about science and 92% think science, engineering, or technology will be important in their future job.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

### V(H). Planned Program (External Factors)

#### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

#### Brief Explanation

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

#### **Incubation and Embryology**

Using materials developed by the University of Illinois poultry specialist in conjunction with state and local 4-H staff, 311 teachers in nine Northeastern Illinois counties responded to a survey asking them to share their perception of the impact of the multi-week **4-H Incubation and Embryology Program**. A reported 10,262 students were enrolled in grades K-2 and 4,698 students were enrolled from grades 3-12. Two surveys were tailored around grade level science skills learning standards for the two grade level groupings [5 science skills for K-2 and 10 for 3-12].

With respect to the science abilities of students in grades K-2, 142 [84%] of the 169 teachers who answered this question indicated a perceived increase in at least one of five [5] science abilities. More than one-half of the teachers reported perceived increases in their students' observation ability [67% of the teachers], hypothesizing ability [66%], predicting ability [60%], organizing/ordering/classifying [57%], and comparing/contrasting [51%].

With respect to students in grades 3-12, 46 [71%] of the 65 teachers who answered this question indicated a perceived increase in at least one of the ten [10] science abilities. More than one-half of the teachers reported perceived increases in their students' observation ability [57%] and communication/demonstration ability [51% of the teachers]. Between 40% and 50% of the teachers reported perceived increases in students' ability to evaluate [48%], interpret/analyze/reason [48%], collect data [43%], hypothesize [43%], predict [43%], problem solve [42%], summarize [42%], and question [42%].

Students were asked to hold up their hands in response to science-related statements. More than 90% of the teachers sharing the information indicated that more than half of their students like science and would like to do more activities like this incubation and embryology program in the future.

#### **Science Program Study**

In 2012, a questionnaire seeking to establish a baseline regarding 4-H members attitude/interest in science, their opinion regarding the relevance/value/utility of science, encouragement to engage in science, and aspirations regarding pursuing a career in science or using it to solve everyday problems was distributed to youth at 4-H science group meetings or science-related 4-H events and collected after completion by a 4-H staff members and volunteers during the summer of 2012. The questionnaire included 11 statements regarding science and 4-H. Youth were instructed to rate the statements as 'Strongly disagree', 'Disagree', 'Agree', and 'Strongly agree'. Those coding data for analysis assigned values ranging from 1 = 'Strongly disagree' to 4 = 'Strongly agree'.

This past year, three evaluations containing ten of the same eleven questions and four additional ones were added specific to three 4-H programs of interest -- robotics, animal science, and 4-H camp. The data collection protocol involved 4-H leaders with a 4-H staff person assisting distributing paper copies of the questionnaire at club meetings or science-related 4-H events and collecting completed questionnaires between April and

October of 2013. A total of 446 were collected from the animal science activities, 115 from a 4-H camp location, and 292 from robotics clubs/groups. Results of an analysis of the responses from each group follows and is compared to the findings from the 2012 baseline study of a cross-program stratum of 405 youth participants.

### **Animal Science Events [n=446]**

#### Attitude/Interest in Science

[1] I like science [78.6% agreed or strongly agreed as compared to 82.2% for the baseline study]; [2] I am good at science [79.6% agreed or strongly agreed as compared to 82.9% for the baseline study]; and [3] I do science-related activities that are not for schoolwork [66.0% agreed or strongly agreed as compared to 70.7% for the baseline study].

#### Relevance/Value/Utility

[1] Science is boring [76.0% disagreed or strongly disagreed as compared to 87.2% for the baseline study]; [2] I think science, engineering, or technology will be important in my future job [88.2% agreed or strongly agreed as compared to 80.6% for the baseline study]; and [3] I can explain to others how I use science, engineering, or technology in my 4-H program/project [75.5% agreed or strongly agreed as compared to 76.6% for the baseline study].

#### Encouragement

[1] I often get to do hands-on activities in my 4-H program/project [94.1% agreed or strongly agreed as compared to 87.6% for the baseline study]; [2] I am encouraged to ask questions about science, engineering, or technology [72.9% agreed or strongly agreed as compared to 79.5% for the baseline study]; and [3] When I graduate from high school, I would like to have a job related to science [63.9% agreed or strongly agreed as compared to 61.2% for the baseline study].

#### Aspiration

[1] Science is useful for solving everyday problems [82.9% agreed or strongly agreed as compared to 70.5% for the baseline study]; and [2] I want to learn more about science [81.0% agreed or strongly agreed as compared to 85.3% for the baseline study].

### **4-H Camp [n=115]**

#### Attitude/Interest in Science

[1] I like science [80.7% agreed or strongly agreed as compared to 82.2% for the baseline study]; [2] I am good at science [80.8% agreed or strongly agreed as compared to 82.9% for the baseline study]; and [3] I do science-related activities that are not for schoolwork [64.8% agreed or strongly agreed as compared to 70.7% for the baseline study].

#### Relevance/Value/Utility

[1] Science is boring [76.5% disagreed or strongly disagreed as compared to the 87.2% for the baseline study]; [2] I think science, engineering, or technology will be

important in my future job [83.2% agreed or strongly agreed as compared to 80.6% for the baseline study]; and [3] I can explain to others how I use science, engineering, or technology in my 4-H program/project [75.2% agreed or strongly agreed as compared to 76.6% for the baseline study].

#### Encouragement

[1] I often get to do hands-on activities in my 4-H program/project [98.3% agreed or strongly agreed as compared to 87.6% for the baseline study]; I am encouraged to ask questions about science, engineering, or technology [80.5% agreed or strongly agreed as compared to 79.5% for baseline study]; and [3] When I graduate from high school, I would like to have a job related to science [53.1% agreed or strongly agreed as compared to 61.2% for the baseline study].

#### Aspiration

[1] Science is useful for solving everyday problems [81.7% agreed or strongly agreed as compared to 70.5% for the baseline study]; and [2] I want to learn more about science [78.1% agreed or strongly agreed as compared to 85.3% for the baseline study].

#### **Robotics Groups [n=292]**

##### Attitude/Interest in Science

[1] I like science [95.5% agreed or strongly agreed as compared to 82.2% for the baseline study]; [2] I am good at science [90.2% agreed or strongly agreed as compared to 82.9% for the baseline study]; and [3] I do science-related activities that are not for schoolwork [79.6% agreed or strongly agreed as compared to 70.7% for the baseline study].

##### Relevance/Value/Utility

[1] Science is boring [94.8% disagreed or strongly disagreed as compared to 87.2% for the baseline study]; [2] I think science, engineering, or technology will be important in my future job [92.0% agreed or strongly agreed as compared to 80.6% for the baseline study]; and [3] I can explain to others how I use science, engineering, or technology in my 4-H program/project [81.1% agreed or strongly agreed as compared to 76.6% for the baseline study].

#### Encouragement

[1] I often get to do hands-on activities in my 4-H program/project [87.8% agreed or strongly agreed as compared to 87.6% for the baseline study]; [2] I am encouraged to ask questions about science, engineering, or technology [85.1% agreed or strongly agreed as compared to 79.5% for the baseline study]; and [3] When I graduate from high school, I would like to have a job related to science [74.4% agreed or strongly agreed as compared to 61.2% for the baseline study].

#### Aspiration

[1] Science is useful for solving everyday problems [91.3% agreed or strongly agreed as compared to 70.5% for the baseline study]; and [2] I want to learn more about science

[94.8% agreed or strongly agreed as compared to 85.3% for the baseline study].

#### Robotics Related Questions

[1] In robotics club, I learned to test and improve robot designs [92.86% agreed or strongly agreed]; [2] In robotics club, I learned to think about different options to identify the best robot solutions [92.5% agreed or strongly agreed]; and [3] In robotics club, I came up with ideas used in robot design [90.97% agreed or strongly agreed].

### **Key Items of Evaluation**

#### Incubation and Embryology

After conducting the **4-H Incubation and Embryology** program in their classrooms, more than half of the K-2 and 3-12 teachers perceived observed increases in their students' observation skills. More than half of the K-2 teachers also reported observed increases in their students' hypothesizing, predicting organizing/ordering/classifying, and comparing/contrasting skills. In addition, nearly half or more of the grades 3-12 teachers reported observed increases in their student's ability to communicate/demonstrate, evaluate, and interpret/analyze/reason.

#### Science Program Study

More than half of the 446 animal science event participants responded favorably to the science related statements. In addition, all percentages were near or slightly below the 2012 baseline with the exception of a larger percentage indicating that science, engineering, and technology [SET] is: [1] Important to a future job; [2] Having opportunities to do hands-on activities; [3] Being encouraged to ask SET related questions; and [4] Wanting to have a science-related job [also see Animal Health and Production planned program for additional results regarding youth and animal science findings].

More than half of the 115 4-H camp participants responded favorably to the science related statements. In addition, all percentages were near or slightly below the 2012 baseline with the exception of a larger percentage indicating that SET is: [1] Important to a future job; [2] Having opportunities to do hands-on activities; and [3] Believing science is useful for solving everyday problems [as see Natural Resources and the Environment planned program for additional results regarding youth camping science findings].

More than three-fourths and as many as 95% of the 292 robotics club participants responded favorably to the science related statements and agreed at the highest rates and had higher mean scores than all other groups who had completed the questionnaire. In addition, all favorable percentages were above the 2012 baseline. With respect to questions related to specific robotics activities, 90% or more of the respondents: [1] Learned to test and improve robot designs; [2] Learned to think about different options to identify the best robot solutions; and [3] Came up with ideas used in robot designs.

Complete findings are still being reviewed but will be made available upon request.