The Field Museum

Evaluation Report
Calumet Environmental Education Program
2003-2004

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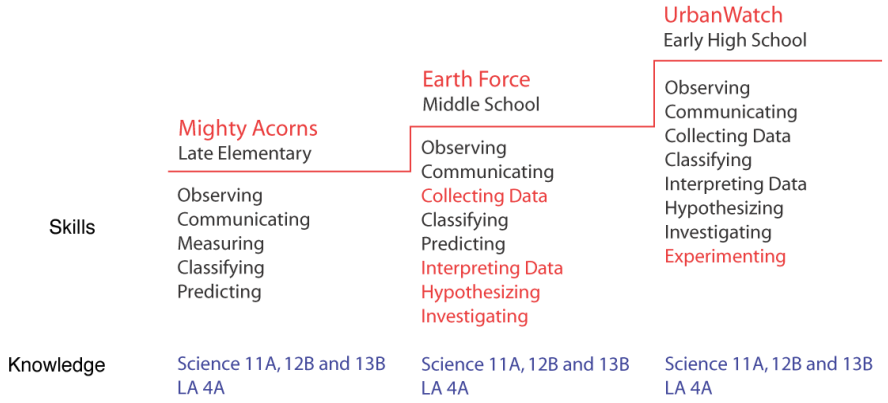
November 2004

EXECUTIVE SUMMARY
Calumet Environmental Education Program Evaluation
2003-2004

PROJECT OVERVIEW

The Field Museum's Calumet Environmental Education Program (CEEP) offers three model conservation education programs that encompass grades four through twelve to create a program continuum for Chicago Public Schools. Mighty Acorns, Earth Force and Urban Watch have individually been piloted, implemented and evaluated. Each program has its own process, yet when these programs are taken in a coherent, consecutive order they form a ladder of environmental education that fosters intellectual, social and process skill development of students and teachers. This pilot project is being conducted at eight elementary schools that feed into George Washington High School on the southeast side of Chicago. This evaluation report synthesizes the data for the period beginning in August 2003 and ending in June 2004.



FIVE GUIDING RESEARCH QUESTIONS

1. What effect has the Calumet Environmental Education Program had on teachers' knowledge and understanding of biodiversity, environmental issues and the local community?
2. What effect has the Calumet Environmental Education Program had on teachers' approach to and inclusion of environmental science content in the classroom?
3. How have teachers coordinated their programs, Mighty Acorns, Earth Force and UrbanWatch, with those taught by other teachers, whether in their same school or in other schools?
4. What effect has the program had on students' knowledge and understanding of biodiversity, environmental issues and the local community?
5. When do students begin to assume personal responsibility for taking independent action to address environmental issues in their homes or communities? What actions do they take? Who influences them?

INSTRUMENTS

The questionnaires were designed to gather information about the frequency with which teachers and students took action for the environment, the types of action activities in which students and teachers engaged and knowledge teachers and students developed about concepts such as biodiversity, interdependence, community and the environment. The evaluation process was designed to answer the question: how much intervention for how long is required to see a significant change in students' and teachers' knowledge about biodiversity and in their ability to take conservation action.

DATA COLLECTION

Three teacher questionnaires were administered at the beginning of the CEEP Summer Institute in August 2003. Students completed their questionnaires in September 2003, before participating in their respective programs. Students and teachers completed the same questionnaires as a post-test in June 2004. Data collected during the 2003-04 school year will be compared with data from the 2002-03 and 2004-05 school years at the conclusion of the three year pilot project in 2005 and will be available in a final three-year Field Museum publication.

DATA ANALYSIS

Responses were entered into a database and analyzed using SPSS (a standard statistical software package). For the closed-ended questions, averages and frequencies were calculated for the fall and spring surveys and the percent change between the two time periods was analyzed. Responses to the open-ended questions were assigned codes for data entry, and the percent of responses for the spring and fall surveys similarly compared.

T-tests were computed to compare the equality of the means for the two surveys and Chi-square tests were used to examine the frequency of responses for the open-ended questions. Both sets of tests used a 5% significance level. Significant findings indicate a 95% confidence that changes occurred as a result of the Calumet Environmental Education Program and not by random chance. Significant findings are generally shaded in light gray on the tables within this report. Some of the statistical tests were analyzed with greater specificity and found to reach a 0.001 significance level. This indicates a 99.9% confidence that the changes occurred as a result of the CEEP program. These findings are denoted as 'highly significant'.

DEMOGRAPHICS

Schools Represented (Fall 2003)	Teachers		Students	
	N	%	N	%
George Washington Elementary	10	24%	173	16%
Jane Addams Elementary	7	17%	216	20%
Virgil Grissom Elementary	4	10%	130	12%
Henry Clay Elementary	4	10%	9	1%
John Marsh Elementary	7	17%	246	23%
Douglas Taylor Elementary	6	14%	191	18%
Orville Bright	2	5%	62	6%
Washington High School	2	5%	39	4%
TOTAL	**42**		**1,066**	

% Students in Program	**Fall 2003**	**%**	**Spring 2004**	**%**	**Total**
Mighty Acorns (4th-6th)	516	48%	453	52%	969
Earth Force (6th-8th)	511	48%	404	46%	915
Urban Watch (9th-12th)	39	4%	19	2%	58
TOTAL	**1066**	**100%**	**876**	**100%**	**1942**

PROGRAM OVERVIEW

During the 2003-04 school year, professional development included:

- Summer Institute (Aug 21-22 & 25-26, 2003)
- Inquiry Group workshop – Learning Communities (Nov 2003)
- Inquiry Group workshop – CEEP for the Future (Mar 2004)
- Curriculum Integration Workshops (Dec 2003 – Feb 2004)
- Illinois Biodiversity Basics (Nov 2003)
- Illinois Natural History Survey's Invasive Species Workshop (Jan 2004)

> *"I am finding this program to be very successful with my students. It is exposing them to nature all around them and making it hands-on - being local is making it their world."*
>
> – CEEP Teacher

In addition to these professional development workshops, teachers were supported by an Internet Portal (an interactive, virtual resource center for teachers to receive and share knowledge and connect with other teachers); resource mailings; conservation education curriculum for teachers and students specific to their program; field and classroom instruction led by museum staff; and Calumet Stewardship Day, a one-day event engaging over 900 students in hands-on education and restoration stations focusing on local environmental issues such as biodiversity and water quality protection.

Question #1: What effect has the Calumet Environmental Education Program had on teachers' knowledge and understanding of biodiversity, environmental issues and the local community?

Teachers demonstrated a significant increase in knowledge and understanding about biodiversity, environmental issues and the local community from participating in the program. Teachers in Mighty Acorns and Earth Force showed the most statistically significant changes on these shaded items:

	Mighty Acorns			**Earth Force**		
	N=22* Fall 2003	N=22 Spring 2004	**% Change**	N=17 Fall 2003	N=12 Spring 2004	**% Change**
Define biodiversity	50%	77%	55%	53%	92%	73%
Define interdependence	55%	91%	67%	65%	100%	55%
Describe 'restoring a native community'	68%	95%	40%	71%	83%	18%
Give two examples of stewardship	41%	82%	100%	29%	42%	42%
List three habitats in Calumet	68%	91%	33%	65%	75%	16%
List an animal threatening Calumet	36%	45%	25%	29%	73%	147%
List a plant threatening Calumet	45%	68%	50%	29%	83%	183%
Identify importance of interdependent relationships between plants-animals in an ecosystem	45%	68%	50%	41%	58%	42%
Identify differences and similiarities of Calumet before-after European settlement	68%	77%	13%	71%	83%	18%
Identify natural resources near school	36%	73%	100%	59%	92%	56%
Identify importance of Calumet conservation	64%	59%	-7%	71%	75%	6%

**N=average number of teachers who responded*
Shaded areas represent significant findings implying a 95% confidence that changes occurred as a result of CEEP

The three UrbanWatch teachers also demonstrated an increase in knowledge of biodiversity and environmental issues, however due to the low number of teachers evaluated, no statistically significant data could be gleaned.

When asked how CEEP affected their understanding of biodiversity, environmental issues and natural resources in the Calumet area, teachers said that they gained a greater awareness or knowledge about:

- environmental issues facing the community, including identifying and removing invasive species, and how to help my students develop a better understanding of the area
- the fact that one species can positively or negatively affect the biodiversity of an ecosystem
- individuals who are involved in protecting the natural areas in the community
- the importance of biodiversity and what I see when walking around Calumet
- a personal connection to the environmental health of the region
- the variety of ecosystems that are present in this urban setting and the remote and exotic areas that are very close to the school

CEEP Teachers at Summer 2004 Institute

> *"It has made me more aware of our natural surroundings. It has shown my students as well as myself that we can make a difference in order to restore our Calumet area."*
>
> - CEEP Teacher

CEEP teachers shared the program has impacted their appreciation of or attitude towards the environment by:

- educating me on the importance of preserving the environment and educating others on its importance
- increasing my understanding that flora and fauna taken for granted in this area can disappear without human stewardship to protect them
- opening my eyes to local diversity and how much green space is still available and not yet developed
- visiting Eggers Woods and finding enjoyment in explaining what I learned in CEEP to people accompanying me
- opening my eyes to the changes that have occurred in the Calumet region since I was a child, giving me an attitude that I have the power to make a difference

> *CEEP has instilled the importance of interdependence amongst all the aforementioned topics, thereby increasing my capacity for comprehending the value of this area and its impact on other areas and species. The Calumet region is of vital significance to the Chicagoland area!*
>
> - CEEP Teacher

While evaluation results from the first year of the pilot project indicated that teacher knowledge and understanding of biodiversity and local enviornmental issues increased from participating in the program, teachers continued to express a need for additional content knowledge about these topics. The Field Museum addressed this need by focusing the CEEP Summer Institute and Spring 2004 Inquiry Group on topics such as ecosystems, native and invasive species and current research and action projects of the Calumet region. The Summer Institute featured hands-on classroom and field activities including species identification, water and soil monitoring and ecosystem studies of concepts such as life webs and energy flows. The Inquiry Group featured behind-the-scenes tours with Field Museum ornithologists, botanists, entomologists and education specialists where teachers learned about current monitoring and action projects of Field Museum scientists and local environmental organizations.

CEEP teachers learning about native bird species such as Black-crowned Night Herons and Indigo Buntings found in the Calumet region from Field Museum ornithologist, Doug Stotz

Question #2: What effect has the Calumet Environmental Education Program had on teachers' approach to and inclusion of environmental science content in the classroom?

Workshop evaluations, classroom portfolios and evaluation results indicate that CEEP teachers increased their integration of environmental science content in classrooms and teaching objectives. As a result of learning about the Calumet region through teacher workshops, classroom field trips and projects, teacher knowledge of natural resources and restoration projects in Calumet increased and thus, teaching objectives reflecting environmental science increased. The number of teachers responding to the questions about teaching objectives was small and the increase is not statistically significant but it does suggest that teachers are more motivated to include environmental education in their teaching.

Indicate the degree to which you feel comfortable with (confident about) each of the following:	Mighty Acorns N=22* Fall 2003**	Mighty Acorns N=22 Spring 2004	% Chng	Earth Force N=16 Fall 2003	Earth Force N=12 Spring 2004	% Chng	Urban Watch N=2 Fall 2003	Urban Watch N=3 Spring 2004	% Chng	Total N=40 Fall 2003	Total N=37 Spring 2004	% Chng
Knowledge of restoration projects in Calumet	2.2	2.4	10%	2.2	2.4	8%	1.5	3.3	122%	2.2	2.5	15%
Giving students ideas about taking action in Calumet	2.4	2.8	17%	2.9	2.7	-7%	3.0	2.7	-11%	2.6	2.7	5%
Knowledge of natural resources in Calumet	2.2	2.4	8%	2.1	2.7	29%	2.0	3.3	67%	2.1	2.5	20%

Which of the following teaching objectives have you used?	Mighty Acorns N=21 Fall 2003	Mighty Acorns N=23 Spring 2004	% Chng	Earth Force N=17 Fall 2003	Earth Force N=12 Spring 2004	% Chng	Urban Watch N=2 Fall 2003	Urban Watch N=3 Spring 2004	% Chng	Total N=41 Fall 2003	Total N=38 Spring 2004	% Chng
Foster caring attitude about environment	0.7	0.9	28%	0.8	0.8	-9%	0.5	0.7	33%	0.7	0.8	11%
Prepare students for further study about environment	0.5	0.6	12%	0.2	0.6	231%	0.0	0.7	NA	0.4	0.6	65%
Instill in students that one person makes a difference	0.6	0.7	12%	0.7	0.8	6%	0.5	0.7	33%	0.7	0.7	9%
Integrate teaching about environment across curriculum	0.5	0.6	24%	0.5	0.6	24%	0.0	1.0	NA	0.4	0.6	38%
Persuade students to take action in community	0.5	0.6	13%	0.6	0.7	13%	0.0	1.0	NA	0.5	0.6	23%

**N=average number of teachers who responded*
***Columns for fall and spring show the mean response while percents are in the percent change columns*
Shaded areas represent significant findings implying a 95% confidence that changes occurred as a result of CEEP

When asked what affect CEEP had on a teacher's approach to teaching or inclusion of environmental science content in their classroom, teachers reported the following:

- seeking environmental materials to extend information provided in textbook coverage of the topic
- modeling attention to nature on a daily basis as opposed to a presentation as a unit of study
- convincing and motivating parents via self-interest to participate in CEEP activities and trips
- developing interesting and educational activities about the local environment
- observing different species and how they adapt to their environment when we were learning about adaptation and natural selection in the classroom
- connecting hands-on field trips with reading about the environment in other subjects, resulting in students having first hand knowledge of a natural area like Eggers Woods and realizing that they have a role in protecting this area

Question #3: How have teachers coordinated their programs, Mighty Acorns, Earth Force and UrbanWatch, with those taught by other teachers, whether in their same school or in other schools?

Professional development workshops for CEEP teachers are designed to increase the amount of integration and time spent coordinating curriculum and resources among teachers within a school and other CEEP schools. During the winter of 2003-04, CEEP staff hosted three-hour after-school Curriculum Integration Workshops with each CEEP school. During these workshops, CEEP teachers discussed existing and potential curriculum alignments between CEEP programs; textbooks and Illinois Learning Standards for science, language arts and social studies, both within their own grade and across their school. Each school developed a curriculum integration model reflecting connections between CEEP curricula across all grades to identify opportunities for a stronger continuum. CEEP teachers use these models as planning tools during the school year and CEEP workshops, adjusting them to reflect new knowledge, activities and resources.

Marsh teachers at CEEP Inquiry Group March 2004

Workshop evaluations from teachers indicated the value of the workshops in coordinating their programs with those taught by other teachers within their same school. CEEP teachers valued the following from the workshops:

- insight into what other teachers at my school are covering in all subject areas
- program connections between science, social studies and language arts
- knowledge of how to incorporate CEEP concepts across the curriculum by analyzing what I teach during the year
- advance planning to align our curriculum
- opportunity to map out exactly how the program will be implemented in grades 6-8

CEEP teachers continue to express a strong desire to have structured time during the school day to discuss curriculum connections and plan with other teachers in their school. Providing structured planning time during CEEP workshops for CEEP teachers and administrators is a continued goal for coming years.

Gallistel teachers at CEEP Inquiry Group March 2004

Teacher evaluations indicated the following examples of conversations CEEP teachers have had with CEEP teachers at their school or other schools:

- sharing excitement of school conservation action projects such as campus park plantings
- integrating environmental issues across disciplines (reading, research/technology and science)
- brainstorming project ideas for the local neighborhood and how to work together as a team
- preparing other teachers in advance for field trips, including how to prepare students for the experience
- brainstorming having Earth Force students become "Action Leaders" or "Peer Tutors" for Mighty Acorns students
- acknowledging the lack of time to meet with other teachers in their grade level and other levels
- recognizing that science is not a subject that has received a lot of attention in their school

Question #4: What effect has the program had on students' knowledge and understanding of biodiversity, environmental issues and the local community?

During the summer of 2003, CEEP staff developed knowledge tests specific to each CEEP program, Mighty Acorns Levels I & II, Earth Force and UrbanWatch. These evaluations were designed to assess changes in student knowledge on CEEP curricula topics such as biodiversity, ecosystems, adaptation, restoration and habitat fragmentation. The following tables reflect evaluation data that was analyzed with greater specificity and found to reach a 0.001 significance level, implying a 99.9% confidence that the changes occurred as a result of the CEEP program. These findings are denoted as 'highly significant' and demonstrate a strong gain in student knowledge and understanding of these topics.

Mighty Acorns I

Q4. Circle the phrase that best describes a plant adapting to a local habitat.

	Percents		
Answer	Fall 2003	Spring 2004	Total
Wrong	74%	49%	292
Correct	**26%**	**51%**	170
Total	100%	100%	462

Q4: Circle the phrase that best describes a plant adapting to a local habitat.

a. Seeds travel in nature by wind or water, to be deposited in another place.
b. Native prairie plants have deep roots to get water and survive fire.
c. Seeds from plants get stuck on animals as they walk by the plant, to be deposited in another place
d. All of the above

The % of students answering correctly increased from 26% to 51%. This increase was highly statistically significant.

Q9. Plants and animals help and don't help each other in many ways.

	Counts		Percents		
# Correct	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0	22	6	8%	3%	28
1	1	2	0%	1%	3
2	15	3	6%	2%	18
3	31	15	12%	8%	46
4	58	29	22%	15%	87
5	82	61	31%	31%	143
6	47	53	18%	27%	100
7	9	28	3%	14%	37
Total	265	197	100%	100%	462
Average # of correct answers				**4.2**	**5**
5 or more correct				**52%**	**72%**

Q9: Plants and animals help or don't help each other in many ways. Mark X for each situation.

Relationships in Nature
a. Deer walks through a prairie spreading seeds.
b. While getting nectar, a hummingbird pollinates a flower.
c. Mosquito bites a human.
d. Cowbird lays eggs in another bird's nest, pushing out the other eggs.
e. Squirrel buries an acorn, which grows into another tree.
f. Bee gets food from a flower and carries pollen to another flower.
g. Bird eats berries from a bush and leaves the seeds in its droppings.

The average number of correct answers increased from 4.2 to 5. This increase was highly statistically significant.

Q11. List two things that can be done to restore native communities of plants and animals.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	216	86	82%	44%	302
1 correct	42	52	16%	26%	94
2 correct	7	59	3%	30%	66
Total	265	197	100%	100%	462
Percent 1 or 2 correct			**18%**	**56%**	

Q11: List two things that can be done to restore native communities of plants and animals.

Possible Correct Answers
a. remove non-native, invasive plants or animals
b. plant native plants (including seed gathering)
c. introduce predators to invasive species area (Galerucella beetles)
d. re-introduce animals (create new habitats or shelters)

The increase in the number of students identifying 1-2 restoration activities correctly was highly statistically significant.

Mighty Acorns II

Q2. For each native species listed in column A, write the number from Column B that best represents the niche, or job, it performs.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	25	10	10%	4%	35
1-2 correct	53	32	21%	13%	85
3-4 correct	43	38	17%	15%	81
100% or 5 correct	130	176	**52%**	**69%**	306
Total	251	256	100%	100%	507

The increase in the percent of students getting all 5 answers correct was 52% to 69% and was highly significant.

Q2. For each native species listed in column A, write the number from Column B that best represents the niche, or job, it performs.

Coyote = Predator that eats mice and ground squirrels
Bacteria = Decomposes dead plant and animal material
Wildflower = Provides food for bees and other insects
Bee = Pollinates flowers
Tree = Produces food and provides shelter

Q5. Write one example for an herbivore, a carnivore and an omnivore.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	156	72	62%	28%	228
1 correct	25	28	10%	11%	53
2 correct	38	63	15%	25%	101
3 correct	32	93	13%	36%	125
Total	251	256	100%	100%	507

Note: percent 2 or 3 correct **28%** **61%**

Q5. Write one example for an herbivore, a carnivore and an omnivore.

Herbivore: rabbit, squirrel, grasshopper (examples)
Carnivore: owl, wolf (examples)
Omnivore: human being, bear, raccoon, fox (examples)

The increase in average number correct (0.78 to 1.70) was highly significant. Percent getting 2 or 3 correct also increased significantly.

Q7. Circle two ways that habitats might become smaller or fragmented.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	87	46	35%	18%	133
1 correct	96	80	38%	31%	176
2 correct	68	130	**27%**	**51%**	198
Total	251	256	100%	100%	507

Q7. Circle two ways that habitats might become smaller or fragmented.

a. A native prairie is planted.
b. A highway expansion cuts through a woodland.
c. Oak trees are planted in a park.
d. Garlic mustard (a non-native plant) shades out woodland flowers.

The increase in the average number correct (0.9 to 1.3) was highly significant. Note that over half the students answered the question perfectly in the post-test, compared to approximately one-quarter on the pre-test.

Q8. Write three items that plants and animals need to grow and reproduce.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	80	34	32%	13%	114
1 correct	10	1	4%	0%	11
2 correct	40	24	16%	9%	64
3 correct	121	197	48%	77%	318
Total	251	256	100%	100%	507

Q8. Write three items that plants and animals need to grow and reproduce.

Possible Correct Answers
Food, Water, Shelter/Space, Soil, Sun

The increase in the average number correct (1.8 to 2.5) was highly significant with just over three-quarters of the responses receiving 3 correct answers for the post-test vs. less than half for the pre-test.

Earth Force

Q3. Circle the answer that is the most serious threat to biodiversity.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
Incorrect	370	251	72%	62%	621
Correct	141	153	28%	38%	294
Total	511	404	100%	100%	915

The increase in percent correct is highly significant (alpha=.001).

Q3. Circle the answer that is the most serious threat to biodiversity.

a. scientists collecting specimens
b. habitat loss
c. community development
d. pollution

Q7. Circle two ways that fragmented habitats can be improved to protect biodiversity.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	148	82	29%	20%	230
1 correct	229	173	45%	43%	402
2 correct	134	149	26%	37%	283
Total	511	404	100%	100%	915

The increase in the average number correct (0.97 vs. 1.18) is highly significant (alpha=.001). .

Q7. Circle two ways that fragmented habitats can be improved to protect biodiversity.

a. A wetland is filled for a new housing development.
b. Develop a greenway between two fragmented habitats.
c. Land is purchased between two natural areas and maintained by a large group of citizens.
d. A highway expansion cuts through a woodland ecosystem.

Q8. Circle the answer that best describes what usually happens when an invasive, non-native species is introduced into a disturbed ecosystem.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
Incorrect	366	219	72%	54%	585
Correct	145	185	**28%**	**46%**	330
Total	511	404	100%	100%	915

The % of students answering correctly increased from 28% to 46%. This increase was highly statistically significant.

Q8. Circle the answer that best describes what usually happens when an invasive, non-native species is introduced into a disturbed ecosystem.

a. The ecosystem will be balanced with the invasive, non-native species living in harmony with the native species.
b. The non-native species will be naturally eliminated by the ecosystem over time.
c. The non-native species will compete for resources needed by native species.
d. The native plants will outgrow the non-native species.

"CEEP taught me that there are many different kinds of biodiversity, for example, genetic diversity, species diversity and ecosystem diversity. The diversity of life enriches the quality of our lives. It helps maintain the atmosphere, keeps the soil fertile and purifies water."

- Earth Force student

Marsh students survey an abandoned railroad corridor near school

UrbanWatch

Q4. Urban Watch monitors the presence and absence of indicator species in an urban green space. Circle the phrase that best describes the term indicator species.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
Incorrect	29	13	74%	68%	42
Correct	10	6	**26%**	**32%**	16
Total	39	19	100%	100%	58

Percent of total students getting answer correct increased from 26% to 32%. This increase is not statistically significant due to insufficient numbers.

Q4. UrbanWatch monitors the presence and absence of indicator species in an urban green space. Circle the phrase that best describes the term indicator species.

a. A species that has a declining population and that is likely to become endangered if it's not protected.
b. A species that is likely to become extinct if protective measures are not taken immediately.
c. Plant and animal species that are direct indicators of overall ecosystem health.
d. A species that is scientifically critical to the functioning of an ecosystem.

Q9. A biological inventory is an essential part of conservation biology work. Name at least 3 steps employed in conducting such an inventory using your UrbanWatch experiences as a guide.

	Counts		Percents		
	Fall 2003	Spring 2004	Fall 2003	Spring 2004	Total
0 correct	36	16	92%	84%	52
1 correct	1	2	**3%**	**11%**	3
2 correct	1	0	**3%**	**0%**	1
3 correct	1	1	**3%**	**5%**	2
Total	39	19	100%	100%	58

Percent of total students getting 1 or more correct answers increased from 9% to 16%. This increase is not statistically significant due to insufficient numbers.

Q9. A biological inventory is an essential part of conservation biology work. Name at least 3 steps employed in conducting such an inventory using your UrbanWatch experiences as a guide.

Possible Correct Answers
a. Select location of study
b. Conduct site survey – note ecological context of site
c. Note weather conditions
d. Create a site sketch – create a map or sketch of site
e. Complete a visit log and BUS/BLOCK taxa data sheet
f. Enter and analyze data on website

Bright student collecting seeds at Van Vlissingen Prairie

"I learned that some plants don't belong to some natural parks and it's not okay to kill other animals because you will destroy the food chain and if you kill one animal other animals will die because their food is gone."

– Mighty Acorns student

Taylor student testing water quality of Lake Michigan at Calumet Park

Question #5: **When do students begin to assume personal responsibility for taking independent action to address environmental issues in their homes or communities? What actions do they take? Who influences them?**

Evaluation results indicate that students are taking independent action to address environmental issues in their homes or communities. The pattern of responses in the tables below indicate a significant difference comparing Fall and Spring data, with the largest statistical difference coming from the increase in students saying they remove invasive species and the next biggest difference from the decrease in students saying "no". The responses also indicate a more sophisticated level of action when compared to last year with an increase in working in natural areas and removing invasive species, both of which directly benefit the biodiversity of the Calumet region. In addition, student write-in responses on the post-tests included new responses of monitoring (natural resources), educating others, reintroducing insects and animals to natural areas and donating and raising money.

In the past 6-8 months, have you done anything that helped make the environment better? If you answer yes, what did you do?	Mighty Acorns N=454* Fall 2003	Mighty Acorns N=439 Spring 2004	**% Chng**	Earth Force N=450 Fall 2003	Earth Force N=335 Spring 2004	**% Chng**	Urban Watch N=25 Fall 2003	Urban Watch N=18 Spring 2004	**% Chng**	Total N=929 Fall 2003	Total N=793 Spring 2004	**% Chng**
No	132	57	-57%	245	122	-50%	16	5	-69%	393	184	-53%
yes-- in general	45	21	-53%	20	10	-50%	0	0	NA	65	31	-52%
plant or work in yard	77	33	-57%	65	47	-28%	2	0	-100%	144	80	-44%
Work in natural area	12	29	142%	22	21	-5%	1	8	700%	35	58	66%
clean up/collect garbage	162	101	-38%	105	90	-14%	6	14	133%	273	205	-25%
remove invasive species	52	252	385%	11	61	455%	1	0	-100%	64	313	389%
recycle	29	16	-45%	9	7	-22%	0	0	NA	38	23	-39%

**N=average number of students who responded*
The pattern of responses is significantly different for the Spring vs. Fall surveys (alpha=.01)
Columns for fall and spring show the mean response while percents are in the percent change columns

Evaluation results indicate that when asked "who or what made you decide to take action and become involved?," students were most influenced by educators at their school or The Field Museum. Student write-in responses in Spring 2004 also included three new influences on their decision to take action and become involved: community group or center, church and a need to improve the area.

> *"I personally think 'the seed' has been planted. The growth currently is unseen, as it has not come to the surface—yet. However, the 'germination' has certainly begun."*
>
> - CEEP Teacher

George Washington Elementary students learn about Wolf Lake

Marsh students removing invasive garlic mustard from Eggers Woods on Calumet Stewardship Day

Evaluation results also indicate that individual activities such as meeting with or belonging to a group that does something about the environment or collecting data about natural areas has increased. This change has a potential correlation to an increased understanding of biodiversity and local environmental issues for students participating in CEEP.

How often do you do the following?	Mighty Acorns N=495* Fall 2003**	Mighty Acorns N=442 Spring 2004	% Chng	Earth Force N=499 Fall 2003	Earth Force N=397 Spring 2004	% Chng	Urban Watch N=25 Fall 2003	Urban Watch N=18 Spring 2004	% Chng	Total N=1013 Fall 2003	Total N=852 Spring 2004	% Chng
Meet with or belong to group that does something about environment	1.9	2.2	15%	1.6	1.7	4%	1.3	2.2	70%	1.7	1.9	12%
Collect or interpret data about natural areas	2.1	2.2	6%	1.6	1.7	4%	1.3	1.8	44%	1.8	2.0	7%
Remove non-native plants from outdoors	2.1	2.6	22%	1.9	2.0	7%	1.6	1.7	6%	2.0	2.3	15%
Help restore natural areas	2.3	2.4	4%	1.9	1.9	2%	1.8	1.8	1%	2.1	2.2	4%

**N=average number of students who responded*
***Columns for fall and spring show the mean response while percents are in the percent change columns*
Shaded areas represent significant findings implying a 95% confidence that changes occurred as a result of CEEP

Teachers noticed students taking personal responsibility or independent action to address environmental issues in the following ways:

- bringing plants to school to donate to the campus butterfly garden planting
- picking up notebook paper that had blown across our school lawn while on a daily nature walk
- learning about local biodiversity by visiting the library on their own to check out books to identify plants and animals seen on a field trip
- handling insects found in the classroom in a more gentle manner instead of fearing them
- calling attention to each other when they notice paper is being wasted while also conserving their use of paper, i.e. writing on back of paper and recycled scraps from art projects
- attending Wolf Lake clean-up days on a Saturday
- visiting Eggers Woods with family members to show where students removed invasive plants on their school field trip
- observing rubbish thrown into Indian Creek, saying that it was so wrong and planning on calling the alderman when they saw such things occur in the future

Gallistel students mulching native trees that were planted at Wolf Lake the year before at Calumet Stewardship Day

"By our third trip to Eggers Woods, my class was feeling that the area was "their" area. When they saw where the mustard grass had grown in all of a sudden, they had a lot of gusto pulling it out. A few of my students were upset to leave any of these plants and were very concerned that the other two classes had removed every single plant after we had gone. One of the students was trying to convince her mother to send her to the summer camp so she could continue projects like this."

- CEEP Teacher

"We shouldn't be the problem, but the solution."

– Earth Force student

CEEP Principals Planning Meeting in May 2004

Clay students conducting water monitoring on Indian Creek

> *"The program has had an impact on the attitudes of my students. They are just beginning to learn. Every year that they are in the program will make a positive difference in their attitudes towards the environment."*
>
> - CEEP Teacher

Gallistel students releasing beetles on invasive purple loosestrife plants at Wolf Lake

Special Thanks to the McDougal Family Foundation for their generous funding of CEEP