

This semi-annual evaluation report will focus on preliminary data from the three programs associated with the Environmental Education Grant. These programs include a) the School at the Zoo Program, b) school garden development, and c) the Blackacre State Nature Preserve school visits. This evaluation examines the development of field studies programs and the designing of outdoor learning spaces on school grounds.

School at the Zoo Program

The School at the Zoo Program is provided for the 4th graders from Cane Run Elementary and Portland Elementary schools as part of the Environmental Education Grant. This program is a “hands-on”, inquiry-based program. At the beginning of the program students completed a program developed pre-test based on the program objectives and Kentucky Core Content, as well as an attitudinal survey. Upon completion of the program the post-test and attitudinal surveys were re-administered. At the end of the week, teachers were given a survey. Each day of the program had an “Essential Question” that provided the days focus. The “Essential Questions” for the program were:

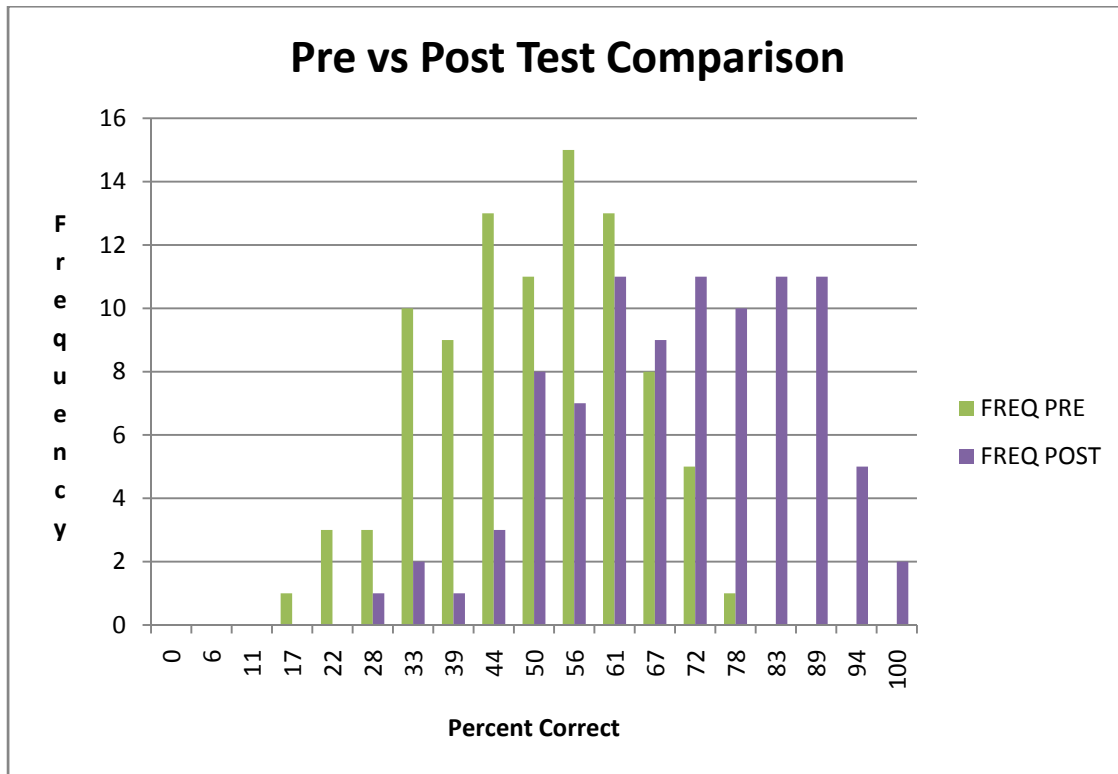
- ❖ How can you describe the similarities and differences between the five groups of vertebrates?
- ❖ How can you describe the adaptations animals have to help them move?
- ❖ How can you describe the similarities and differences between the different kinds of consumers?
- ❖ How can you describe the similarities and differences between temperate deciduous forests and tropical rainforests?
- ❖ How can zoos and students like me protect nature?

There were 92 students from the program schools that completed both the pre- and post-test for the School at the Zoo Program. A comparison of the pre-test to the post-test results showed a statistically significant ($t=11.44$, $p<.001$) improvement in student knowledge on the test. Table 1: Summary of School at the Zoo Program provides the mean and median percent correct out of the 18 multiple choice questions, along with the standard deviation, range of the percents correct, the minimum percent correct, and maximum percent correct. Figure 1: Comparison of Pre- and Post-Test displays the frequencies of the percents correct on the pre- and post test.

Table 1: Summary of School at the Zoo Program

	<i>Pre-Test Percent Correct</i>	<i>Post-Test Percent Correct</i>
<i>Number of Participants</i>	92	92
<i>Mean</i>	49.76	70.29
<i>Median</i>	50	72.22
<i>Standard Deviation</i>	13.56	16.35
<i>Range</i>	61.1	72.2
<i>Minimum</i>	16.7	27.8
<i>Maximum</i>	77.8	100

Figure 1: Comparison of Pre- and Post-Test



There was little change in attitude as measured by the pre-and post attitudinal survey. Table 2: Comparison of Pre-and Post Attitudinal Survey summarizes the results. The Post-Attitudinal Survey included five additional questions about the student’s feelings about the program. All were very positive about the experience with the highest agreement (99 %) with the statement “Did you like touching the animals?” and the lowest agreement (82%) with the statement “Did you like your Science Notebook assignment?”.

Table 2: Comparison of Pre-and Post Attitudinal Survey

Question	Pre % Agree	Post % Agree
1. I would like to work in a zoo.	72	74
2. I think animals and plants are important to conserve and thus protect.	98	100
3. I turn the lights off when I leave a room.	91	89
4. I like to spend time in my neighborhood park.	65	56
5. I think snakes play a role on this planet.	53	63
6. Did you like School at the Zoo?	NA	97
7. Did you like your Science Notebook assignments?	NA	82
8. Did you like touching the animals?	NA	99
9. Did you like the keeper talks?	NA	91
10. Did you like the activities you did?	NA	97

The teacher survey was extremely positive with all teachers (4 from Portland Elementary and 2 from Cane Run Elementary) indicating strong agreement or agreement on all questions. Some of the comments were:

- ❖ “My students learned so much more than they could ever have gotten from me or in-school learning. They were focused most of the time and excited about the lessons and activities. This trip also taught me pertinent info that I may have taught incorrectly in the past (i.e. bears do not hibernate!).”
- ❖ “...I think that our children were able to make connections from the lectures to real life. They really enjoyed the animals and getting a chance to experience them ‘hands-on’.”
- ❖ “Your program was right-on for what our students need to enhance the JCPS curriculum. Low level readers were actively engaged, enthusiastic and retaining material which would have been difficult to do otherwise.”
- ❖ “The curriculum was relevant to the core content.”

School Garden Survey

In February 2010, the teachers and administrators completed a survey about school gardens. Cane Run Elementary had 29 teachers and administrators complete the survey and Portland Elementary had 31 teachers and administrators complete the survey.

Some of the highlights from Cane Run Elementary include:

- ❖ 68% (n=17) of those that responded (n=25) reported having a school garden, 32% (n=8) reported the school did not have a garden, and 8% (n=2) reported access to a community garden,
- ❖ 19 of the 29 respondents reported an interest in starting a Garden Club, while 2 of the 29 reported currently having a Garden Club; 18 of the 29 respondents reported interest in starting an Environmental Club, while 5 of the 29 reported currently having an Environmental Club,
- ❖ 22 of the 26 respondents reported that they or someone in their school would be interested in sponsoring an after school gardening club, while 4 of the 26 responded that they or someone in the school would not be interested,
- ❖ The top three items that were indicated as the highest need (combined response of “I need it” or “very important – crucial for success”) to start the initiative were seeds or plant materials (100%), tools (97%), and soil and or compost system (85%),
- ❖ The top three items that were indicated as the highest need (combined response of “I need it” or “very important – crucial for success”) to learn more about were taking full advantage of parents/community volunteers (81%), pest control and diseases (81%), and district/school soil and gardening policies (81%),
- ❖ The only program that over half of the respondents indicated participation or active with was Blackacre State Nature Preserve (96%), and

- ❖ The highest perceived road blocks (combined response “a big hassle” or “the major issue – deal breaker”) for a successful school garden were money (63%), summer time and vacation care (46%), and lack of parental support (36%).

Some of the highlights from Portland Elementary include:

- ❖ 43% (n=13) of those that responded (n=30) reported having a school garden, 57% (n=17) reported the school did not have a garden, and 3% (n=1) reported access to a community garden,
- ❖ 8 of the 31 respondents reported an interest in starting a Garden Club, while no one reported currently having a Garden Club; all 31 respondents reported currently having an Environmental Club,
- ❖ 17 of the 26 respondents reported that they or someone in their school would be interested in sponsoring an after school gardening club, while 9 of the 26 responded that they or someone in the school would not be interested,
- ❖ The top three items that were indicated as the highest need (combined response of “I need it” or “very important – crucial for success”) to start the initiative were tools (100%), soil and or compost system (97%), and soil and or compost system seeds or plant materials (93%),
- ❖ The top four items that were indicated as the highest need (combined response of “I need it” or “very important – crucial for success”) to learn more about were district/school soil and gardening policies (79%), taking full advantage of parents/community volunteers (79%), curriculum connections (75%), and students involvement strategies (75%),
- ❖ The only program that over half of the respondents indicated participation or active with was Blackacre State Nature Preserve (89%), and
- ❖ The highest perceived road blocks (combined response “a big hassle” or “the major issue – deal breaker”) for a successful school garden were money (85%), summer time and vacation care (48%), and no gardening space (44%).

Blackacre State Nature Preserve

All grades from Cane Run Elementary and Portland Elementary visited Blackacre State Nature Preserve at least once between September 2009 and March 2010. The science topics that were the focus of the visits are listed in Table 3: Blackacre Topics. Additionally, there were some Literacy and Social Studies topics integrated within the visits. These topics included in Social Studies - Pioneer Children, Pioneer Homestead, Settling a Pioneer Farm, Homestead Exploration, Life in the 1700's, Landforms and Regions of Kentucky, Culture and Society Celebrations, Candles and Cornhusk Dolls, and in Literacy - Sensory Words and Poetry, Images from the Senses, and Personal Writing Skills. There were approximately 367 students from Cane Run Elementary (enrollment 2009-2010 is 463) and 262 students from Portland Elementary (enrollment 2009-2010 is 263) that visited Blackacre State Nature Preserve for a total of 629 individual students. When taking into account the number of visits (same student multiple times), Blackacre State Nature Preserve hosted 789 student visits from Cane Run Elementary

and 601 student visits from Portland for a total of 1,390 student visits. A breakdown of the attendance is provided in Table 4: Blackacre State Nature Preserve Attendance.

Table 3: Blackacre Topics

GRADE	LIFE SCIENCE	PHYSICAL SCIENCE	EARTH SCIENCE
CANE RUN ELEMENTARY			
K	<ul style="list-style-type: none"> • Domestic Animal Characteristics • Squirrel Characteristics 	<ul style="list-style-type: none"> • Classifying Objects • Properties of Water* • Properties of Leaves 	
1	<ul style="list-style-type: none"> • Characteristics of Plants • Plant Sensory Hike • New Plants Nature Quilt 		
2	<ul style="list-style-type: none"> • Insect Life Cycles • Insect Habitats 	<ul style="list-style-type: none"> • Changes in Nature Hike • Changes in Leaves 	
3	<ul style="list-style-type: none"> • Organisms in Stream • Structures of Animals 	<ul style="list-style-type: none"> • Sound Maps • Sound Off • Sounds of Nature 	<ul style="list-style-type: none"> • Limestone Hike • Sand and Rock in Filters* • Earth Materials as Resource
4	<ul style="list-style-type: none"> • Food Chain in Pond • Food Chain in Forest 		<ul style="list-style-type: none"> • Geology Trail • Erosion* • Calcite Hike • Minerals and Hardness • Earth Materials as Resource
5	<ul style="list-style-type: none"> • Tree Identification • Diversity of Life Photography • Plant Adaptations Seeds 		<ul style="list-style-type: none"> • Erosion*
PORTLAND ELEMENTARY			
K	<ul style="list-style-type: none"> • Domestic Animal Characteristics • Forest Animal Characteristics 	<ul style="list-style-type: none"> • Observable Physical Properties • Classifying Objects 	<ul style="list-style-type: none"> • Shadow Hike • Light Levels in Environment • Organisms in Sun/Shade
1	<ul style="list-style-type: none"> • Characteristics of Plants • Plant Sensory Hike 	<ul style="list-style-type: none"> • Solids and Liquids* 	<ul style="list-style-type: none"> • Meteorologist Hike • Air and Movement
2	<ul style="list-style-type: none"> • Insect Life Cycles • Insect Habitats 	<ul style="list-style-type: none"> • Changes in Nature Hike • Making Ice Cream 	
3	<ul style="list-style-type: none"> • Seed Hike • Structures of Plants 	<ul style="list-style-type: none"> • Sound Maps • Sound Off • Sounds of Nature 	<ul style="list-style-type: none"> • Limestone Hike • Earth Materials* • Earth Materials as Resource
4	<ul style="list-style-type: none"> • Food Chain in Pond • Food Chain in Forest 		<ul style="list-style-type: none"> • Geology Trail • Erosion* • Calcite Hike • Soil Components • Sun’s Position and Shadows
5	<ul style="list-style-type: none"> • Tree Identification • Diversity of Life Photography • Plant Adaptations Seeds 		<ul style="list-style-type: none"> • Floods*

*In cooperation with the Louisville Water Company

Table 4: Blackacre State Nature Preserve Attendance

GRADE	Cane Run Elementary			Portland Elementary			Totals		
	<i># of Classes</i>	<i># of Visits</i>	<i># of Students</i>	<i># of Classes</i>	<i># of Visits</i>	<i># of Students</i>	<i># of Classes</i>	<i># of Visits</i>	<i># of Students</i>
K	3	2	69	2	2	40	5	4	109
1	3	1	72	2	2	40	5	3	112
2	3	2	45	3	2	57	6	4	102
3	3	3	65	2	3	44	5	6	109
4	3	3	62	2	3	33	5	6	95
5	2	2	54	2	2	48	4	4	102
TOTALS	17	13	367	13	14	262	30	27	629

Conclusion

This report provides data on the development of field studies and the designing of outdoor learning spaces on school grounds for this grant. Overall findings are:

- ❖ The Louisville Zoo data showed positive results in the pre-and post-tests. Students were able to do much better on the post-test than the pre-test. Teacher surveys revealed that they were very positive about the students' participation in this program. Student Attitudinal surveys showed students were very positive about their participation in the School at the Zoo Program.
- ❖ The School Garden Survey showed that there was an interest in having school gardens, but the current level of awareness was inconsistent. Both schools identified potential barriers and topics they feel they need to learn the most about.
- ❖ Blackacre State Nature Preserve has provided most students multiple environmental learning opportunities. We are in the process of designing a teacher, and potentially a student survey, for future evaluations.

Current plans for future evaluations include examining academic data, surveys, descriptive data, and walk-through data.