

This semi-annual report focuses on the School at the Zoo Program, Blackacre State Nature Preserve, mid-year teacher surveys, student focus groups, and principal and coordinator interviews.

School at the Zoo Program

The School at the Zoo Program is provided to 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. Each day of the program had an “Essential Question” that provided the day’s focus. The “Essential Questions” for the program were:

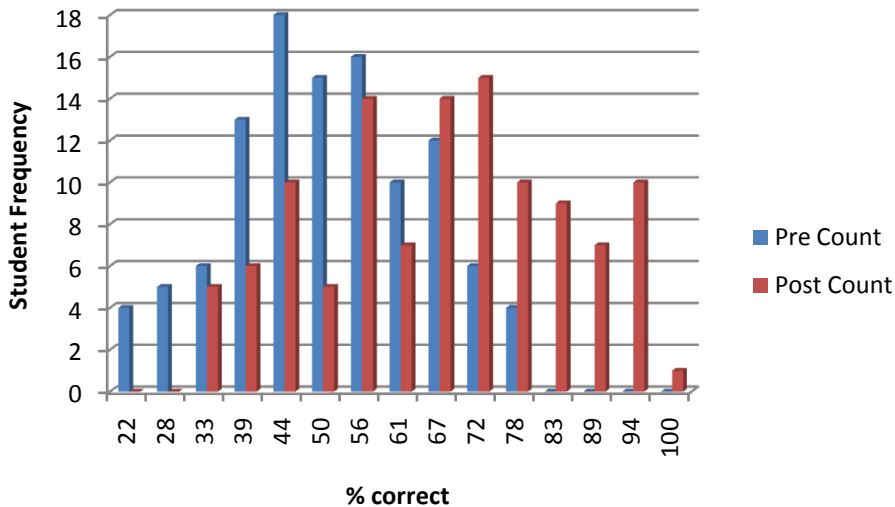
- ❖ How can you describe the similarities and differences between the five groups of vertebrates?
- ❖ How can you describe the adaptations animals have to help them move?
- ❖ How can you describe the similarities and differences between the different kinds of consumers?
- ❖ How can you describe the similarities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

In the fall of 2010, there were 109 students, out of the 117 students served, 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 ($t=10.67$, $p<.001$) improvement in student knowledge on the test. The effect size is .72 which is considered a large effect size (Fields, 2009, formula p. 332). Table 1: Summary of School at the Zoo Program provides the mean and median percent correct out of 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 shows 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>
Number of Participants	112	113
Mean	50.99	66.47
Median	50.00	66.67
Standard Deviation	13.86	17.66
Range	56	67
Minimum	22	33
Maximum	78	100

Figure 1: Comparison of Pre- and Post-Test



There was little change in attitude as measured by the pre-and post attitudinal survey on most items. The two questions where students showed much higher agreement with were “I would like to work in a zoo” and “I think snakes play a role on this planet”. 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 (96%) with the statement “Did you like touching the animals?”

Table 2: Comparison of Pre-and Post Attitudinal Survey

Question	Pre % Agree	Post % Agree
1. I would like to work in a zoo.	54	74
2. I think animals and plants are important to conserve and thus protect.	96	99
3. I turn the lights off when I leave a room.	91	87
4. I like to spend time in my neighborhood park.	88	86
5. I think snakes play a role on this planet.	56	73
6. Did you like School at the Zoo?	NA	91
7. Did you like your Science Notebook assignments?	NA	92
8. Did you like touching the animals?	NA	96
9. Did you like the keeper talks?	NA	94
10. Did you like the activities you did?	NA	94

The fall 2010 School at the Zoo Program’s data was very similar to the 2009 School at the Zoo Program’s data.

Blackacre State Nature Preserve

All grades from Cane Run Elementary and Portland Elementary have visited Blackacre State Nature Preserve once between September and mid-October 2010. There were 400 students from Cane Run Elementary (enrollment 2010-2011 is 400) and 250 students from Portland Elementary (enrollment 2010-2011 is 253) that visited Blackacre State Nature Preserve for a total of 650 individual students. (Note that enrollment varies; the enrollment reported is the end of the third month enrollment.) A breakdown of the attendance is provided in Table 3: Classroom Visits through 10/21/2010. The science topics that were the focus of the visits are listed in Table 4: Topics by Grade.

Table 3: Classroom Visits through 10/21/2010

GRADE	CANE RUN ELEMENTARY		PORTLAND ELEMENTARY		TOTALS	
	# of Classes	# of Students	# of Classes	# of Students	# of Classes	# of Students
K	3	69	2	40	5	109
1 st	3	60	2	35	5	95
2 nd	3	67	2	42	5	109
3 rd	3	67	2	50	5	117
4 th	3	66	2	48	5	114
5 th	3	71	2	35	5	106
Total	18	400	12	250	30	650

Table 4: Topics by Grade

GRADE	Cane Run Elementary	Portland Elementary
	TOPICS	TOPICS
K	<ul style="list-style-type: none"> -Life sci. ext, Pillbug Hike -Life sci. ext, Farm Animal comparison -Life sci. ext, Schoolyard/Blackacre habitat comparison 	<ul style="list-style-type: none"> -Life sci. ext, Farm Animal comparison -Life sci. ext, Blackacre Fish -Life sci. ext, Where do Pillbugs live?
1 st	<ul style="list-style-type: none"> -Life sci. ext, Seed Hunt -Life sci. ext, Plant hike -Life sci. ext, Schoolyard/Blackacre seed comparison 	<ul style="list-style-type: none"> -Life sci. ext, Plant Hike -Life sci. ext, Seed Hunt Life Sci. Ext, Schoolyard/ Blackacre plant comparison
2 nd	<ul style="list-style-type: none"> -Life sci. ext, Aquatic insects -Life sci. ext, Meadow/Forest insects -Life sci. ext, Schoolyard/ Blackacre insect comparison 	<ul style="list-style-type: none"> -Life sci. ext, Aquatic Insects -Life sci. ext, Meadow/Forest insects -Life Sci., Schoolyard/Blackacre insect comparison
3 rd	<ul style="list-style-type: none"> -Life sci. ext, Farm animal structures and function -Life sci. ext, Plant and Seed hike -Life sci. ext, Arthropod comparison 	<ul style="list-style-type: none"> -Life sci. ext, Structure and function in pond organisms -Life sci. ext, Farm Animals structures and function -Life sci. ext, Plant and Seed Hike
4 th	<ul style="list-style-type: none"> -Life sci. ext, Aquatic Food Chains - Life sci. ext, Decomposition - Life sci. ext, Evidence of Food chains on school grounds and Blackacre 	<ul style="list-style-type: none"> -Life sci. ext, Aquatic food Chains -Life sci. ext, Food Chain hike -Life Sci. ext, Decomposers
5 th	<ul style="list-style-type: none"> -Life sci. ext, Pond Study -Life sci. ext, Planet FOSS photo challenge -Life Sci. ext, Square foot biodiversity survey 	<ul style="list-style-type: none"> -Life sci. ext, Seed hike -Life sci. ext, Pond study - Life sci. ext, Square foot biodiversity survey

Teacher Surveys

In late November and early December 2010, all teachers at Portland Elementary and Cane Run Elementary were given a survey regarding different components of the evaluation. The primary purpose of this survey was to gauge what aspects of the program are going well and which need more attention. The following sections will provide a summary from the survey. See Appendix for the survey used.

GENERAL INFORMATION

There were 49 teachers total completing the survey, 28 from Cane Run Elementary and 21 from Portland Elementary. The median years experience teaching was in the 5-9 years range at both schools. This is a change for Cane Run, whose median years experience was in the 10-14 year range in May 2010. Cane Run had 5 new teachers join their staff this past year and Portland added 3 new teachers. The median years at the present school was in the 0-4 year range, with Cane Run’s median being in the 0-4 year range and Portland’s being at the split between the 0-4 year range and the 5-9 year range. When examining the grades taught 12.2% (n=6) taught kindergarten, 10.2% (n=5) were 1st grade, 14.3% (n=7) were 2nd grade, 22.4% (n=11) were 3rd grade, 8.2% (n=4) were 4th grade, 6.1% (n=3) were 5th grade, and 38.7% (n=19) taught multiple grades, were teacher assistants, were special area teachers, or left an open response. Table 5: Grade Taught shows the breakdown for grades taught by school.

Table 5: Grade Taught

Grade	Cane Run Elementary		Portland Elementary		Combined	
	Number	Percent	Number	Percent	Number	Percent
K	4	14.3	2	9.5	6	12.2
1 st	2	7.1	3	14.3	5	10.2
2 nd	2	7.1	5	23.8	7	14.3
3 rd	7	25.0	4	19.0	11	22.4
4 th	2	7.1	2	9.5	4	8.2
5 th	2	7.1	1	4.8	3	6.1
Blank*	9	32.1	4	19.0	13	26.5

**Blanks typically were teachers that taught multiple grades, teacher assistants, or special area teachers.*

PROFESSIONAL DEVELOPMENT (PD)

The majority (87.7%) of the teachers reported having at least 18 total PD hours. Of those hours, 67.3% (95.2% at Portland and 46.4% at Cane Run) of the teachers estimated that 7 or more hours were focused on environmental education.

When teachers were asked to “rate the overall quality of the Professional Development with respect to your growth in teaching and implementing the Environmental Education program,” the highest rated areas, marked “strong” or “very strong”, were: “Engaging the students” (82.6%), “School/Community Gardens” (73.8%), “Ideas for the classroom” (72.1%), and “Making environmental

education relevant to student lives” (71.1%). There were six categories that had over a 10% difference between the two schools in how they were perceived in affecting growth. These categories are highlighted in Table 6: Ratings of PD.

Table 6: Ratings of PD (*Percent Strong or Very Strong*)

PD TOPIC	Cane Run n=28	Portland n=21	Total n=49
Foss Curriculum – Module Implementation	65.2% n=23	58.8% n=17	62.5% n=40
Foss Curriculum – OBIS/Science in the Schoolyard	50.0% n=12	50.0% n=18	50.0% n=42
Blackacre Visits	69.6% n=23	66.7% n=18	68.3% n=41
School at the Zoo Program	62.5% n=8	62.5% n=8	62.5% n=16
Specific content that I used	48.0% n=25	55.6% n=18	51.2% n=43
Ideas for the classroom	58.3% n=24	89.5% n=19	72.1% n=43
Ideas for field experiences	58.3% n=24	70.6% n=17	63.4% n=41
Instructional Ideas	56.0% n=25	84.2% n=19	68.2% n=44
Making environmental education relevant to student lives	64.0% n=25	80.0% n=20	71.1% n=45
Engaging the students	76.9% n=26	90.0% n=20	82.6% n=46
School/Community Gardens	68.0% n=25	82.4% n=17	73.8% n=42

Note: Not all numbers add up to total number possible since teachers had the option to leave blank or mark NA if that particular item did not apply to them.

The n in the table represents the number of respondents that answered this question. The percentage given is that based on the n for each question, not the total number.

PEOPLE RESOURCES

The teachers were asked to rate different positions on a scale from “not supportive” to “highly supportive” with respect to “the level of support given for implementation for Environmental Education.” Overall, the positions rated as “highly supportive” or “supportive” were the “Environmental Education Coordinator” (95.8%) and the “Off-site Personnel (90.9%)”. There was nearly a 10% difference in the percent of teachers rating “highly supportive” and “supportive” between the two schools on all of the other ratings. Table 7: Ratings of People Resources shows the percentages for each position and the overall combined.

TABLE 7: Ratings of People Resources (Percent of teachers that reported this person as either “supportive” or “highly supportive”)

Position Being Rated	Cane Run n=28	Portland n=21	Total n=49
Principal	75.0% n=28	85.7% n=21	83.7% n=49
School Environmental Education Program Coordinator	92.6% n=27	100% n=21	95.8% n=48
Science Resource Teacher	72.0% n=25	95% n=20	82.2% n=45
Other Teachers	55.6% n=27	85.0% n=20	68.0% n=47
Other Staff (counselor(s), FRYSC, etc.)	66.7% n=24	76.2% n=21	71.1% n=45
Off-site Personnel (Blackacre, Zoo, Gheens, Foss Developers, etc.)	88.5% n=26	94.4% n=18	90.9% n=44

Note: The n in the table represents the number of respondents that answered this question. The percentage given is that based on the n for each question, not the total number.

ENVIRONMENTAL EDUCATION TOPICS TAUGHT

The teachers were asked how much time they spent on science in general per week. Then they were asked of that time, how much was spent on environmental education topics. From the teachers' responses it seemed that Portland teachers were spending more time on environmental education topics. The median amount of time spent on science was 3-4 hours per week. Of the 3-4 hours per week spent on science, the median amount of time spent on Environmental Education was between 26-50% of that time. Table 8: Teacher Science Time shows the amount of science time and the percent of that time used on environmental education topics.

Table 8: Teacher Science Time

% of Time on EE→	0%		1-25%		26-50%		51-75%		76-100%	
	Cane Run	Portland	Cane Run	Portland	Cane Run	Portland	Cane Run	Portland	Cane Run	Portland
Total Science Time↓										
0-2 Hours	14%	5%	11%	10%	4%	5%	0%	5%	0%	0%
3-4 Hours	0%	0%	14%	5%	29%	10%	0%	15%	0%	0%
5-6 Hours	0%	0%	7%	0%	7%	5%	7%	15%	4%	10%
7-8 Hours	0%	0%	0%	0%	0%	10%	0%	0%	0%	0%
9+ Hours	0%	0%	0%	0%	4%	0%	0%	5%	0%	0%

The topics that over 50% of the teachers report having taught are: land stewardship (98.0%), water quality (89.8%), conservation of energy (79.6%), recycling (73.5%), respect for animals and plants in the local environment (73.5%), and gardening/composting (71.4%). Compared to the May report the two topics that are being taught significantly more are land stewardship (24.5% May 2010) and water quality (38.8% May 2010). Weather and climate have decreased from 71.4% in May 2010. It is important to note that a) some of the topics that fewer teachers reported teaching may have been taught by others, such as Blackacre or the Louisville Zoo staff member, and b) this is a semester report and additional topics are likely scheduled for 2nd semester. TABLE 9: Topics Taught by the Teachers has the complete list of topics taught by teachers.

TABLE 9: Topics Taught by the Teachers (Percent of teachers that have taught this topic this past year)

Topic	Cane Run n=28	Portland n=21	Total n=49
Land Stewardship	100%	95.2%	98.0%
Water Quality	82.1%	100%	89.8%
Conservation of Energy	71.4%	90.5%	79.6%
Recycling	71.4%	76.2%	73.5%
Respect for Animals and Plants in the Local Environment	75.0%	71.4%	73.5%
Gardening/Composting	60.7%	85.7%	71.4%
Weather/Climate	50.0%	47.6%	49.0%
Earth Science/Conservation of Natural Resources	46.4%	52.4%	49.0%
Wildlife	53.6%	42.9%	49.0%
Forests and Wetlands/Nature Preservation	32.1%	52.4%	40.8%
Endangered Species	28.6%	14.3%	22.4%
Biodiversity	23.8%	10.7%	16.3%
Mineral Resources	7.1%	9.5%	8.2%

INTEGRATION OF ENVIRONMENTAL EDUCATION ACROSS THE CURRICULUM

The place where integration of environmental education is currently being implemented most consistently is in reading/literacy. Reading/Literacy classes had the highest percent of teachers teaching environmental education at least once a week. This was also the highest number of teachers that did not leave blank or filled in NA. Talking with the school personnel and students, the main ways of integration with literacy is through reading books (such as the “Wild About Reading” series) as well as going outside to read or do literacy activities. It should be noted that although reading/literacy has the highest level of reported integration, the percentage reporting integration has dropped (over 15%) from the spring of 2010. The percentage of reported integration has either maintained about the same or dropped from the spring of 2010. TABLE 10: Integration of Environmental Education Across the Curriculum has the percentage of teachers that reported integrating Environmental Education at least once a week into each of the content areas by school and the total.

TABLE 10: Integration of Environmental Education Across the Curriculum (Percent of those non-blank and non-NA that report teaching environmental education at least once a week)

Subject	Cane Run n=28	Portland n=21	Total n=49
Reading/Literacy	47.8% n=23	88.9% n=18	65.8% n=41
Social Studies	52.4% n=21	58.8% n=17	55.3% n=38
PE	53.8% n=13	55.6% n=9	54.5% n=22
Art/Music	23.1% n=13	62.5% n=8	38.1% n=21
Math	28.6% n=21	50.0% n=16	37.8% n=37
Computer	23.1% n=13	40.0% n=5	27.8% n=18

Note: The n in the table represents the number of respondents that answered this question. The percentage given is that based on the n for each question, not the total number.

SCHOOL/COMMUNITY BASED ENVIRONMENTAL EDUCATION INITIATIVES

For the question, “which of the following (see Table 11 for list) school/community based environmental education initiatives has your class participated?”, over 75% of the teachers reported having participated in using the school grounds as an outdoor classroom (89.8%), taking their students on a field trip(s) to Blackacre State Nature Preserve (85.7%), and recycling (77.6%). The reported usages of both “School Grounds” and “Blackacre” have increased by approximately 10% each since the spring of 2010. The program with the least percent of teachers having their classes participate was the Louisville Zoo Program, but this is because this program was only for the 4th grade and was not a school-wide initiative. The percent of “Stewardship Projects” and “Visited a Park” have both decreased by approximately 20% since the spring of 2010. It is important to remember that this is a mid-year report. TABLE 11: School/Community Based Environmental Education Initiatives has the reported percentage of teachers that have participated in each initiative by school and the total.

TABLE 11: School/Community Based Environmental Education Initiatives (Percent reporting class has participated in this initiative)

Initiative	Cane Run n=28	Portland n=21	Total n=49
School Grounds (Outdoor Classroom)	89.3%	90.5%	89.8%
Blackacre Field Trip	82.1%	90.5%	85.7%
Recycling	67.9%	90.5%	77.6%
Working on School Garden	60.7%	90.5%	73.5%
Visited a park	25.0%	42.9%	32.7%
Stewardship Projects	10.7%	42.9%	24.5%
School at the Zoo Program	21.4%	28.6%	24.5%

TEACHING METHODS USED WHEN TEACHING ENVIRONMENTAL EDUCATION

Teachers were asked to mark how frequently they use the various teaching methods (see Table 12) when teaching the theme of environment to their class. The top four methods used to teach environmental education on a weekly basis was consistent between Cane Run Elementary and Portland Elementary. These methods are: hands-on activities (65.3%), notebook/journal writing (65.3%), discussion of reading materials (61.2%), and scientific inquiry (61.2%). There were several discrepancies between the schools with respect to the teaching methods they reported using at least once a week, . The two methods used the least on a weekly basis by teachers were debate (4.1%) and field trips (8.2%). The rank order of these methods was very similar to those found in May of 2010. TABLE 12: Teaching Methods Used when Teaching Environmental Education shows the percentages by school and the total for each method for those that reported using that method at least once a week.

TABLE 12: Teaching Methods Used when Teaching Environmental Education (Percent reporting using this teaching method at least once a week when teaching environmental education)

Teaching Method	Cane Run n=28	Portland n=21	Total n=49
Hands-on Activities	57.1%	76.1%	65.3%
Notebook/Journal Writing	60.7%	71.4%	65.3%
Discussion of Reading Materials	53.8%	71.4%	61.2%
Scientific Inquiry	50.0%	76.1%	61.2%
Students Organize Data/Classify	39.3%	42.9%	40.8%
Group Problems/Investigations	42.9%	38.1%	40.8%
Use Technology to Explore Environmental Issues	39.3%	33.3%	36.7%
Group Projects/Presentations	39.3%	33.3%	36.7%
Field Experiences (Schoolyard/local parks)	28.6%	19.0%	24.5%
Students Designed Experiments	25.0%	14.3%	20.4%
Field Trips	10.7%	4.8%	8.2%
Debate	3.6%	4.8%	4.1%

BLACKACRE STATE NATURE PRESERVE

Over 80% of the teachers from Cane Run Elementary and Portland Elementary reported having been on at least one field trip to Blackacre State Nature Preserve. Blackacre’s ratings were extremely positive with over 70% marking “agree” or “strongly agree” for all components. Their highest ratings came in the categories of “what was taught related to core content” (90.0%), “I was able to use what the students learned/did at Blackacre back in the classroom” (87.5%), and “The Blackacre’s staff were helpful” (87.5%). The category with the lowest percent of “agree” and “strongly agree” was “The Blackacre’s staff’s lessons gave me models that I can use back at school” at 72.5%. Most teachers had been to Blackacre only once this school year. TABLE 13: Blackacre Results shows the percentages by school and the total.

TABLE 13: Blackacre Results (Percent rated either “agree” or “strongly agree”)

Blackacre Component	Cane Run n=28	Portland n=21	Total n=49
What was taught is related to core content	87.0% n=23	94.1% n=17	90.0% n=40
I was able to use what the students learned/did at Blackacre back in the classroom	82.6% n=23	94.1% n=17	87.5% n=40
Blackacre staff were helpful	87.0% n=23	88.2% n=17	87.5% n=40
Time was well spent	69.6% n=23	88.2% n=17	77.5% n=40
The students learned a lot	73.9% n=23	76.5% n=17	75.0% n=40
The Blackacre visits added to my own growth as a teacher	65.2% n=23	88.2% n=17	75.0% n=40
The students enjoyed going	69.6% n=23	82.4% n=17	75.0% n=40
The Blackacre’s staff’s lessons gave me models that I can use back at school	65.2% n=23	82.4% n=17	72.5% n=40

Note: The n in the table represents the number of respondents that answered this question. The percentage given is that based on the n for each question, not the total number.

ENVIRONMENTAL EDUCATION TEACHER RATINGS OF MATERIALS

Teachers were asked to give their perception of how supportive the FOSS materials are. When examining the teacher ratings of the material the FOSS Materials and Modules received the highest percent of teachers rating it as either “supportive” or “highly supportive.” Comparing the results to the May 2010 teacher survey the percentages dropped in all areas for Cane Run and in “Foss On-Line Material” for Portland. There is a large discrepancy between the two schools and the percent that rated the materials “supportive” or “highly supportive”. TABLE 14: Teacher Ratings of Environmental Education Materials has the percentages of the teachers that rated the materials as “supportive” or “highly supportive” by school and total.

TABLE 14: Teacher Ratings of Environmental Education Materials (Percent rated either “Supportive” or “Highly Supportive”

MATERIAL	Cane Run n=28	Portland n=21	Total n=49
FOSS Material/Modules	52.4% n=21	93.3% n=15	69.4% n=36
Science in the Schoolyard On-Line Material	43.8% n=16	91.7% n=12	64.3% n=28
OBIS On-Line Material	50.0% n=18	80.0% n=10	60.7% n=28
FOSS On-Line Material	42.9% n=21	58.3% n=12	48.5% n=33

Note: The n in the table represents the number of respondents that answered this question. The percentage given is that based on the n for each question, not the total number.

ENVIRONMENTAL EDUCATION SUPPORTS AND BARRIERS

Teachers were asked “what do you see as the main supports (barriers) for teachers when teaching (prevent teaching) Environmental Education.” They were asked to mark all that apply. The highest percent of teachers agreeing as supports for environmental education was the “resources provided” and “professional development”. In May 2010 there was a discrepancy with “resources provided” as a support, but it was also seen as a barrier. This survey indicates a much stronger agreement between the supports and barriers than the May report. The largest perceived barrier continues to be “time”. TABLE 15: Environmental Education Support and TABLE 16: Environmental Education Barriers lists the percentages for both schools and the totals.

TABLE 15: Environmental Education Supports

MATERIAL	Cane Run n=28	Portland n=21	Total n=49
Resources provided	75.0%	95.2%	83.7%
Professional development	67.9%	85.7%	75.5%
Student Interest	60.7%	81.0%	69.4%
Environmental education support of other content areas	64.3%	57.1%	61.2%
Issues are relevant	50.0%	52.4%	51.0%
My own content knowledge	50.0%	42.9%	46.9%
Student backpack – Field study equipment	46.4%	33.3%	40.8%

TABLE 16: Environmental Education Barriers

MATERIAL	Cane Run n=28	Portland n=21	Total n=49
Don't have enough time	71.4%	66.7%	69.4%
Too many other topics to cover	39.3%	52.4%	44.9%
Don't have enough knowledge	35.7%	14.3%	26.5%
Children uninterested	17.9%	0.0%	10.2%
Don't have enough resources	3.6%	14.3%	8.2%
Issues too controversial	0.0%	0.0%	0.0%

Student Focus Groups

The evaluator met with three student focus groups at each school. There was a 3rd grade, 4th grade, and 5th grade focus group from each school. The students were selected by the Principals and Coordinators with the understanding that the students were to be diverse in gender and ethnicity as well as have strong verbal skills. Each group had 5-6 students in them. The focus groups were approximately 45 minutes long per group and the same eight questions were asked. This section will combine the student responses by question to get the students' viewpoint of what it means to be a student at an environmental education school.

QUESTION 1

Describe some of the things you have done and learned in science.

When asked this question, many of the students started with listing some of the topics that they have studied. Some of the general topics include: light and heat, sound (vibrations), friction and motion (ex. rollercoaster), and motion and force (energy types). There were several topics that were more directly related to environmental education. These topics include:

- different kinds of seeds,
- different kinds of soil (subsoil, topsoil, clay, sand, humus, etc.),
- different types of land and water (like saltwater or fresh; lakes, creeks, or oceans; frozen water expands),
- erosion and water cycle (evaporation, condensation, and precipitation),
- food chains and webs,
- fungi and bacteria,
- hydro-potting and hydro-growing,
- plants doing photosynthesis (create their own food with air, sun, and water; plants breathe out oxygen and humans breathe out carbon dioxide),
- producers and consumers (herbivores, carnivores, omnivores, insectivores),
- structures of animals and bugs (anoles, crickets, earthworms; beetles - exoskeleton),
- the life cycle of animals and bugs (egg, larvae, pupae, and adult),
- the life cycle of trees ("seed, root, sprout, stem, leaves, then bigger and bigger"),
- weathering, and
- what environments plants can grow in.

In addition to the above topics, many students talked about specific activities and experiments that their classes completed. These included:

- checking the school and make sure lights are off and faucets aren't leaking (environmental club),
- composting (both in class activities and with EE coordinator),
- discussing plants colonists grew,

- doing a water experiment on erosion using water and soil,
- examining the pond water under the microscope – the water had bacteria,
- going to the school pond and seeing a dragon fly laying its eggs (as well as watching the pond being built),
- growing a garden,
- growing lima beans,
- having a representative from Kentucky Fish and Wildlife come and talk to them about topics like animals’ special features, kinds of animals, illegal activities, hunting, and what do if they see a wild animal,
- learning about recycling,
- observing crayfish and doing an experiment with testing their reactions,
- taking care of roaches and learning by observing them (how they outgrow their shells and problems with predators) ,
- using the microscopes to look at roaches, carrot roots, animal parts, pumpkin roots, and
- using their science notebook and studying a rotting log as the teacher talked about the bugs eating the log.

QUESTION 2

What are some of the field trips that you have gone on and can you tell me what you learned and did?

When asking the students about field trips, all students had an answer. Table 17: Field Trips lists where the field trips went and a summary of what the student learned.

Table 17: Field Trips

Site	Learning/Activity
Blackacre	<ul style="list-style-type: none"> - don’t litter because the animals can eat and choke (2 students) - drawing insects and identifying body parts - under logs all sorts of bugs - soil and stuff - went around to find what we would see in a garden - bacteria in water - animal ecosystem and decomposing (2 students) - studied a snake and then had to identify it - went on a seed hunt and learned about seeds - looked for bugs and fungus - how seeds travel - life pattern of a pine tree - picked out a square foot and counted bugs and living organisms; someone found a wasp
Huber’s Farm	<ul style="list-style-type: none"> - picked pumpkins and apples; learned how plants grow

Oxmoor Farms	<ul style="list-style-type: none"> - planting seeds and played a game that used identifying seeds - examined bugs - tried different foods; made bread with wheat and honey (2 students) - learned about farm animal life; learned about pigs - played predator, prey, decomposer game
Livestock Expo	<ul style="list-style-type: none"> - learned about cows - making wool and sweaters (2 students) - learned animal names (like calf, sire, piglet) (2 students) - saw baby chicks in an incubator at the petting zoo
Pioneer Day	<ul style="list-style-type: none"> - how Indians lived in tepees, survived, and stayed warm - trade for things like beads for a cow
Operation Brightside	<ul style="list-style-type: none"> - picked up trash around the neighborhood (2 students)
Portland Wharf Park	<ul style="list-style-type: none"> - picked up trash, identified trees, played a game using a compass, saw caterpillars
Camping Trip	<ul style="list-style-type: none"> - made face paint from rocks and minerals - learned about owls - saw animal tracks and then looked them up to find what made them different animals - went by water; different kinds of bacteria, tadpoles, and underwater animals - tried different foods to eat - ponds and insects; couldn't touch some plants since might be poisonous - girls' camp site had a centipede; the boys' had a raccoon
Zoo	<ul style="list-style-type: none"> - looking (armadillo, gorillas, orangutan) and touching the animals (snake, hedgehogs, kangaroos) (6 students) - saw gorillas and monkeys eat and "reproduce" - when eating lunch some geese followed us; saw eight turtles - got to see things other people didn't get to do like watching them prepare the animals' food (3 students) - saw how they would trade something with the gorilla if he had something he shouldn't - learned about wildlife and animals - boa constrictors kill prey by squeezing them to death; learned about herbivores, omnivores, carnivores, insectivores, decomposers, and scavengers - learned orangutans are strong and the males are very territorial; the orangutans are very protective of their group - animals have different adaptations

QUESTION 3

Do you have a school garden? If so, do you help with it? (Ancillary questions: How have you helped with the garden? What are some of the activities you do w/ the school garden? What have you learned from the school garden?)

When students were asked these questions, their answers focused primarily on the jobs they did, general comments, and what they observed. Some of the jobs mentioned were watering the plants (multiple student responses), putting/changing soil in the beds (multiple student responses), picking the ripe food, putting worms in the garden beds to help with decomposition, using mulch to provide “shade” for the worms, planting tulips and other flowers near the pond, putting mulch near the pond to attract decomposers, getting the soil ready, planting seeds (multiple student responses), preparing the beds before winter, putting in rocks so bugs would come, weeding, using the decomposing bins (got to shake it), and putting waste in bins.

Many students discussed the garden in general and eating the food. The comments included:

- “students like the garden”,
- “they like the different plants they can grow, like carrots, turnips, spinach, and mustard greens”
- “making a salad with the garden produce (carrots, radishes, turnips, and mustard greens)”
- “we ate things out of the garden”
- “I liked the potatoes and tomatoes”
- “I like the sweet potatoes, squash, and putting out the cherry tomatoes”
- “tried watermelon, but it wasn’t ripe”
- “kept eating them (cherry tomatoes)”
- “they (cherry tomatoes) were overflowing so we had to eat them”

The other responses were students describing what they observed or learned from having the outdoor gardens. These responses included:

- how the teacher gave the job of the “gardener” and how students took turns in this position,
- how they studied the plants and then drew pictures of them,
- learned it took a long time to grow carrots,
- how during the summer program, they observed the different plants and watched the bees getting nectar for flowers to bloom,
- how the plants produce oxygen,
- that the rocks have all sorts of bugs under them,
- how we need bees for plants to grow,
- how they observed the compost pile,

- how the environmental coordinator discussed not having fish in their pond, because it would eat everything,
- last year they would pick things from the garden and then smell them,
- how the smashed cantaloupes got bugs in them, studied the bugs, identified them as stink bugs - “don’t step on them”, and
- how they did not use chemicals.

QUESTION 4

Does your classroom go outside? How often? What do you learn when you go outside?

When students answered this question they tended to focus on activities that they had done with their classes. The activities mentioned were:

- making things with leaves,
- doing a project with leaves and acorns,
- going outside to learn about land and water,
- going outside to do experiments, like a) precipitation experiment – “we had soil on one side and water on the other, we had it covered in plastic wrap with an ice cube on top. We waited until condensation formed under the plastic wrap and then precipitated down.” b) erosion experiment – “used a cup with a hole in it and water to make a stream through the soil.”
- doing a weathering experiment with gravel in a container,
- doing another experiment to find out if worms like shade or sunlight better,
- every Monday the Environmental Club goes outside (one student mentioned his class does not go outside that much),
- going outside under the “reading tree” – teacher read a book about how things (plants) are the same (made) and different (some are poisonous),
- going to the pond – discussed how animals will live there; in Spring they are hoping to have frogs and tadpoles,
- drawing in their science notebook what they thought the pond would look like in the Spring,
- discussing why some water like the pond was frozen, but some streams were not – they concluded it was because of running water,
- discussing life cycles around the pond and then writing in their science notebook,
- learning in Environmental Club how to clean and prepare the garden bins,
- learning that “you just can’t cut down trees, then we won’t have enough air”,
- observing different plants growing,
- going out and doing a recycling activity,
- going to the “reading tree” on special occasions,
- making a salt-map ,
- observing a rotting tree, and

- putting algae from the pond under a microscope.

QUESTION 5

Can you tell me some ways that people can help their environment? Do you do any of these? (Ancillary question: Have you made any changes because of what you learned in class?)

The student responses for what people can do in general to help the environment were:

- pick up paper and cans outside (multiple students),
- save water by using a stopper in the sink,
- fix leaky faucets, so you don't waste gallons of water,
- don't litter (multiple students), because it can pollute the water,
- put wrappers in recycling bins and not in the trash,
- make compost piles,
- keep worms in the soil,
- turn off lights when you leave the house,
- plant flowers for the birds and bugs so that they have a habitat,
- don't pour grease down the sink,
- recycle cans and things you drink out of (multiple students),
- help elderly with recycling,
- reuse paper to save trees,
- help the environment go green and plant trees to make oxygen,
- help clean up oil spill,
- when get Christmas present, unwrap carefully to reuse the wrapping,
- use containers instead of plastic bags for lunch and a reusable bottle, and
- use a decomposer.

The specific things that the students said that they were doing were:

- "sometimes I walk around the neighborhood with my cousins and pick-up trash" (multiple similar responses),
- "my family doesn't litter",
- "I put cauliflower out in grass so the worms could eat it instead of throwing it away",
- "recycle at home",
- "we stopped trying to put out so much garbage, instead we sort and recycle",
- "plant seeds, so squirrels can have a home",
- "in the backyard we planted stuff like peppers, sun flowers and my granny planted peas, tomatoes, and some kind of fruit"
- "me and my grandmother sweep the ally of garbage and recycle the paper"
- "at my mom's house there are baby trees – I try to mow around them",

- “my family at home we try to recycle a lot and reuse some, but not as much as here”, and
- “we reuse things like a shoebox.”

QUESTION 6

What do you like most about being at an environmental school?

The student responses to this question were quite varied. One theme was that they got to do things students at other schools did not get to do. Such as more recycling, Operation Brightside, get to spend more time outside, more environmental field trips, more hands-on experiments, get to plant flowers, get to feed animals, get to make a butterfly garden, dissect owl pellets, get to have taste test of the food they grew, get to learn how to recycle and reuse, get to make things, get to have more field studies, participated at the Youth Summit, and get to “discover stuff.”

Another theme focused on what the school has. Some of the items mentioned were: the pond (multiple students), “reading tree”, recycling bins, trail, butterfly garden, and the sun dial. As one student said, “normal schools don’t have ponds or outdoor classrooms – I feel like this is a special school.” One student noted that they were excited because they got to be in the newspaper.

Some students focused on what they were learning. These students mentioned learning how plants grow and stages of the butterfly, observing the caterpillars in the garden, observing animals like turtles and tadpoles, and studying life cycles.

A handful of students focused on societal benefits. As one student stated, “I feel like I am going to live longer, because we’re reducing pollution and making the environment better.” Other students mentioned how it helped the earth and the environment in general.

A couple of students noted how they enjoyed seeing the growth of the program. One student stated, “third grade was the first year of it, but fourth and fifth grade we are really into it.” Another student said, “seeing the butterfly garden lets us see how far we have come.”

QUESTION 7

Is there anything that you do not like about being at an environmental school?

The things mentioned that the students did not like revolved around getting dirty, being outside when it was hot, bugs, some trees have spiky branches which make them hard to climb, touching decaying stuff, and furry animals. One student stated, “Other people throw stuff on the ground and I don’t want to always have to be the one who picks it up.” A group of students mentioned that they didn’t like all the work, like paperwork and test, which they had to do after going on a field trip. They also mentioned how some of the field trips were better than others or even some topics were better

than others on the same field trip. One student mentioned that sometimes the adults on field trips talk too much and don't let them do much.

QUESTION 8

Are there any comments you would like to add?

There were a wide variety of answers to this question. The largest group of answers was things that the students had learned and activities done. These items included: land and water, animals, wildlife, decomposers, the three parts (head, thorax, and abdomen) of the beetle, the environment in general (multiple students), about bugs, how to make a stream table (showed how we hurt the environment when we do certain things), soil erosion experiment (multiple students), the precipitation experiment, the dissection of an owl pellet, how to light a light bulb with wires, about primary, secondary, and tertiary consumers, stages of crayfish, how to do experiments, energy pyramid, and recycling.

Another set of responses were around what they would like to see in the future. Some of these responses included: a water table, another garden, an environmental lab with live animals (like mice), field trips that other classes went on or about specific topics, more posters about energy/force/motion/gardens/soil, and more space.

Other responses seemed to be focused on what they liked. These included: the outdoor classroom, how sponsors help the school, how being an environmental school is a big deal, going to Oxmoor Farm to taste and pick pumpkins, how they got to see the lizards eat crickets, go on field trips, do "fun stuff and cool projects", how "we're helping the earth and not making more waste", and how "I'm learning about how to make the environment better."

Principals and Coordinators Interview

Interviews were conducted with the principals and the school's coordinators for both Portland Elementary School and Cane Run Elementary School. This section summarizes the results of these interviews. The same set of questions was used for both the coordinators and principals.

Teacher, Student, and Family Growth

After interviewing the two principals and the two Environmental Education (EE) Coordinators, the one area that all four mentioned that this year the teachers have grown compared to last year is their comfort with integrating environmental education across subjects. A few quotes indicating this growth are:

- "Teachers are finding ways to incorporate EE in regular lessons this year."

- “Teachers have grasped the idea of integrating EE, not just making it another add-on.”
- “Seeing teachers change as integrating subjects, not just extra. It’s more of a thematic approach instead of everything in time blocks.”
- “EE is becoming more natural for them, more of what they do without the extra effort.”

One of the coordinators offered several examples of lessons teachers completed outdoors, such as a) classifying leaves and identifying the tree using characteristics of the leaves, b) doing perimeter and area of the garden beds, and c) collecting data on lengths of shadows at various times and then making predictions based on this data. The other coordinator noted how every teacher has the book *Math in the Garden* (National Gardening Association) and how they are using this book to assist with integrating math with the raised beds and outdoor areas. The principal at this school noted that they have fully implemented integration in science and literacy. This year’s focus is integrating environmental education with mathematics. Additionally, the related arts teachers, art, librarian, and PE/wellness, are also integrating environmental education into their programs. One principal stated, “*Teachers are seeing the value of making things relevant and hands-on in other areas besides science. Environmental education has changed the attitudes of the teachers in viewing real-world connections for their classroom lessons and using relevant strategies.*”

The students are reported to be going outside much more this year than last with the teachers using the outdoor classroom. One of the principals noted that the students and teachers built most of the gardens and that they were proud of their work. Similarly, a coordinator commented about the pond that “the students own it – it’s an opportunity that they don’t get anywhere else.” Some changes noted in instruction include: teachers are using more EE open response questions (ORQ), doing more inquiry, EE concepts are being incorporated in their morning “Care for Kids” (JCPS’s social-emotional program) sessions as conversation starters, using EE in having students produce quality writing pieces (“Kids’ writing is more authentic and there is an increased depth of knowledge that is demonstrated.”), and connecting EE across contents. Other changes include: a) one coordinator reported students studying rocks and minerals with test kit to identify rocks, b) students presenting at the Youth Summit on gardening, recycling, and composting, c) one school’s after school program helps take care of the grounds (this includes some students from other schools), d) students helping take care of the gardens during the summer, e) an extra school-based person does an environmental focus every Wednesday, f) one school reports that the Environmental Club has doubled in size since last year with younger students wanting to join, g) one school reports even more composting and recycling since last year (estimated trash has been cut in half since using recycling dumpster), and h) one school chose an environmental project this year of “Pennies for Polar Bears.”

When discussing parents the interviewees discussed how parents were informed of the happenings at the school as well as their involvement. Parents have been kept informed with monthly newsletters, open houses (with student guides), school websites, and one school writes articles periodically for the neighborhood newsletter. Both schools are working on getting parents more involved at the school. One school invites parents to their “Pioneer Day” and “Earth Day”, some parents

help with the gardening, the other school hosts a series of family nights, parents are invited to field studies, and parents participate in the neighborhood clean-ups. One school is working on a grant for incentives to try to increase parental involvement, especially at their family nights. Both schools report parents are more involved and interested this year, but still have room for growth. One anecdotal note was when one of the schools went on a camping trip with 11 parent chaperones, only 2 of these parents had ever been camping themselves.

Leading Change

There are several reported ways that the principal's and Environmental Education (EE) Coordinators are leading change in their schools. Some of the ways that the coordinators are leading change are:

- modeling and co-teaching lessons to demonstrate how to integrate and connect EE topics, use inquiry techniques, involve all students, and manage the classroom,
- providing resources for both teachers and students to use (both schools have a resource room devoted to this),
- provide professional development on EE topics,
- assist with setting up EE projects and materials (worm compost in rooms, crayfish tanks, and classroom experiments),
- work with community partners (to be discussed more in later section),
- inform parents (newsletters, websites, and open houses),
- assist with curriculum (lessons, resources, extension modules), and
- coordinate and attend EE field trips.

The EE Coordinators are trying to be change agents not just with the students, but also with the teachers. As one coordinator put it, "I am trying to be a major change agent within the school. I see the EE magnet as an opportunity to not only connect the students, but also the teachers to the real world." The coordinator added, "(I want) to lead people that will help them develop their own expertise and competence to be self-sufficient EE teachers."

In addition to being change agents for the schools, the coordinators are presenting at conferences, such as the North American Association of Environmental Education, and presenting professional development for teachers district-wide on EE.

The principals are trying to lead change by providing resources, coordinating and overseeing projects, working with the coordinators, and reinforcing some of the EE ideas. As one principal stated, "I want to find models and real ways they (teachers) can integrate EE rather than seeing it as an add-on. I want it to be reasonable, sensible, and something beneficial to the students – not something else they have to do." The other principal discussed how they were working with a local middle school to enhance the after-school opportunities.

Community Involvement

Both schools are reporting efforts to make their communities aware of the opportunities for students, as well as their desire to be vital parts of the community. The community awareness comes from the Showcase of Schools (opportunity for parents district-wide to meet representatives from all district schools to learn more about the schools), flyers, newsletters, articles in neighborhood newspapers, signage, videos, post cards, and the schools' website. One school has participated in Operation Brightside where they did a neighborhood clean-up project. Additionally, this school is in conversation with a local church that recently burnt down and is in the process of rebuilding. The church wants the students to be involved in a new community garden.

One major discrepancy between the schools was the number and involvement of the community partners. One school, close to an industrial park and with more ground space at the school, has had a lot more community involvement than the other school, which is located in an urban area with few major industries and corporations in the immediate area. The second school noted that they are having difficulty in getting community partners and the ones they have are limited in what they are able to do. The other school has extensive partnership with a handful of local corporations. These companies have "adopted" the schools and have provided personnel, large equipment, and significant donations to the school. Because of these partners the school has been able to get a fitness trail, numerous extra garden beds (they have 14 – 4 from the grant and the other 10 primarily because of two of their partners), 5 outdoor seating areas (large rocks and equipment to set up in a circular setting), butterfly garden, 12 foot sundial, outdoor space for studying force and motion, compost area, and a wetland area currently in the works. The coordinator meets once a month with the community partners. These partners see this as an opportunity to make a difference in kid's lives and see them as possible future employees. The coordinator related a story where a local small business donated supplies and he said that he saw this school program as "a neighborhood changing opportunity."

Environmental Education Components

This section will review the comments by the coordinators and principals regarding the major components of the environmental grant.

FOSS

All of the comments regarding FOSS were positive. One coordinator reported that it was excellent because it extended the modules. The other coordinator reported that it was going well and that the teachers were using FOSS and extending to the outdoors in math, science, reading, and writing.

The principals both reported FOSS as going great and one stated it was especially helpful to the new teachers.

Blackacre State Nature Preserve

All of the comments were positive regarding the class trips to Blackacre. Some of the comments were:

- Blackacre offers opportunities for children to have EE experiences off-site and then come back to school and make connections.
- Teachers have made positive changes over time with the visits.
- Blackacre provides children and families an opportunity to be in the forest and have quality learning experiences.
- This is a great part of the program.
- Teachers are planning their lessons to go there in connection to the FOSS modules, this is in addition to the lessons the Blackacre staff does.
- This year has been much better, last year the students were amazed at just being that far from the school and the newness of it all. This year the students have been more focused on the curriculum.
- They (Blackacre) are helping build the background knowledge.

Schools at the Zoo Program

This program was described by one of the coordinators as an intensive, high – quality experience. A couple of the words used to describe this program for fourth graders were “incredible” and “very effective”. One of the coordinators noted that this program set the stage for the year and provided a review and introduction to the life sciences. The other coordinator remarked how the teachers were highly complementary of the program and how it serves as a springboard for beginning teaching the life science FOSS module. She also mentioned how it connects directly to content on the statewide testing. It was stated that this program “gives kids opportunities they would not have anywhere else.” One principal pointed out how the zoo program brings the curriculum alive. One suggestion that a principal made was to extend this program to include the third graders as well. She was confident that a second year would add a lot to what they would learn.

School Gardening

One school had just had their first successful harvest. They were looking forward to the spring to expand what they were growing and to partner with a local senior citizens’ center in gardening projects. One of the coordinators discussed how the kids grew, harvested, and cooked the food they

grew and had a lunch for senior citizens. Additionally, she said that the students were being taught incredible life lessons, such as growing the plants, learning about soil, water, seeds, and plants. The students learned about healthy and organic foods and how not to use pesticides. She further stated that the real value was in watching the kids take ownership. One principal noted how much the teachers were learning.

Field Studies

When discussing the field studies, one principal mentioned how they were all great and the specific ones mentioned were Oxmoor Farms, the Louisville Science Center, Blackacre, Farm Bureau, and the North American Livestock Exposition. One of the coordinators talked about having great opportunities and mentioned the Louisville Water Company and Oxmoor Farms. She stated that these trips helped students make connections as well as to see the farming aspect compared to the gardening aspect. The other coordinator pointed out "because kids don't get outside a lot, these field studies have helped them become more familiar with and more connected to the outdoors." One principal said that without the EPA grant they could not have done much in this area.

Integrating Environmental Education

Although this has been talked about quite a bit (see above), one principal remarked that being an EE Magnet is one of the best since it makes sense to do and it is easier to get parent and teacher buy-in. One coordinator stressed that the integration is the strength of being an EE school. It is in everything you do. She stated the integration of EE "forms the foundation of a successful program." She said that last year this was hard to do, but this year, with some modeling, everything is integrated. Their goal is to make it a part of everyday, connected to real life.

Stewardship Projects

One coordinator mentioned several of the projects like watering the garden, litter patrol, work on the pond, remove invasive plants from a historic home near the school, building community gardens, help at a local senior citizens home, recycling, weeding, and taking care of the orchard. One principal mentioned that they are doing projects with goal being for every student to see that they have something to offer. One principal candidly said that this is the area of being an EE magnet that needs the most growth.

Challenges

There were several challenges mentioned by the principals and the coordinators. These challenges are:

- Teachers often struggle with finding the time to do some of the activities. Although they are working on embedding these activities, it is still a challenge.

- Communication is always an issue, especially with everyone being so busy. Communication is critical especially from the district level on down.
- In order to implement some of the initiatives there is at times extended wait time for the district to complete their portion of the project.
- There is a need to continue helping teachers and students to make connections.
- Very limited resources, such as space, in one of the school yards. Feel the need of the district to assist them in getting necessary resources (example bird sanctuary).

Both principals expressed concern about sustainability. They felt that the Environmental Coordinators are crucial to the continuation of the successes of this program. The position is currently funded for one more school year, but the principals stated that the program will not be effective without this position.

Conclusion

Below is a summary of the report and possible recommendations for each of the major areas of the EPA Grant:

- **School at the Zoo** – This part of the program consistently gets strong results. The pre- and post-test showed statistically significant growth, the student focus groups (4th and 5th graders) were very positive about the experience, and the principals and coordinators thought that it set the stage for the life sciences and gave students experiences that they would otherwise not have the opportunity to get. The student focus groups discussed some of the activities and what they learned while participating in the School at the Zoo Program. (p. 1-2, 16, 25)
- **Blackacre State Nature Preserve** – The teacher surveys were very positive as a whole about Blackacre. The strengths identified were “what was taught was related to core content”, “I was able to use what the students learned/did at Blackacre back in the classroom”, and “Blackacre staff were helpful”. On several of the other statements there were some discrepancies to the percent that marked “agree” or “strongly agree” between the two schools. The student focus groups discussed some of the activities and what they learned while at Blackacre. (p. 3, 11, 15, 25)
- **Professional Development (PD)** – Nearly 90% of the teachers reported having at least 18 hours of PD and the majority of those estimated that they had at least seven hours or more related to environmental education. The highest rated areas, marked “agree” or “strongly agree”, overall were: “Engaging the students” (82.6%), “School/Community Gardens” (73.8%), “Ideas for the classroom” (72.1%), and “Making environmental education relevant to student lives” (71.1%). (p. 4-5)
- **People Resources** - The positions rated with the highest percent of “highly supportive” or “supportive” were the “Environmental Education Coordinator” (95.8%) and the “Off-site Personnel (90.9%)”. (p.6)
- **Environmental Education Topics** - The topics that over 50% of the teachers report having taught are: land stewardship (98.0%), water quality (89.8%), conservation of energy (79.6%), recycling

(73.5%), respect for animals and plants in the local environment (73.5%), and gardening/composting (71.4%). It is important to note that this is a semester report and additional topics are likely scheduled for 2nd semester. The student focus groups discussed ways that they knew people in general could help the environment, but also specific ways that they were trying to help the environment. The principals and coordinators report that the teachers and students are going outside much more this year than last. (p. 7, 19, 22)

- **Integration of Environmental Education Across the Curriculum** – The highest level of integration is reported in the areas of Reading/Literacy (65.8%), Social Studies (55.3%), and Physical Education (54.5%). Principals and coordinators are stating that integration of EE across the curriculum is where the teachers have made some of the strongest growth. (p. 8, 21-22, 26)
- **School/Community Based Environmental Education Initiatives** - Over 75% of the teachers reported having participated in using the school grounds as an outdoor classroom (89.8%), taking their students on a field trip(s) to Blackacre State Nature Preserve (85.7%), and recycling (77.6%). The reported usages of both “School Grounds” and “Blackacre” have increased by approximately 10% each since the spring of 2010. Of the different aspects, stewardship is a recognized area of needed growth by the principals and the teachers. The student focus groups discussed the activities that they did while outdoors and what they learned. Both schools reported parents getting more comfortable themselves with environmental issues, but there is still room for growth. (p. 9, 18, 22-23, 26)
- **Teaching Methods** - The top four methods used to teach environmental education on a weekly basis were hands-on activities (65.3%), notebook/journal writing (65.3%), discussion of reading materials (61.2%), and scientific inquiry (61.2%). The student focus groups tended to remember the experiments that they did and the concepts related to the experiments. (p. 10, 14-15, 21)
- **School Gardens** – The student focus groups were very talkative and excited when they got a chance to talk about the school garden. Much of what they talked about was some of their experiences and responsibilities along with what they learned. Both coordinators talked about how they are using the gardens not only in educating the students, but also as an outreach to local senior citizens. (p. 17-18, 25)
- **Environmental Education Materials** - When examining the teacher ratings of the material the FOSS Materials and Modules received the highest percent of teachers rating it as either “supportive” or “highly supportive.” There is a large discrepancy between the two schools and the percent that rated the materials “supportive” or “highly supportive”. The coordinators and principals reported that FOSS was going well and was especially helpful to the newer teachers. (p. 12, 24)
- **Supports and Barriers** - The highest percent of teachers agreeing as supports for environmental education was the “resources provided” and “professional development”. The largest perceived barrier continues to be “time”. (p. 13)
- **Being an Environmental Education Magnet School** – The students reported that they felt special and had opportunities that students at other schools did not get. (p. 20)

- **Community Partners** – There is a large discrepancy between the availability and number of community partners between the two schools. (p. 24)

Recommendations

- 1) A recommendation by one of the principals was to expand the Louisville Zoo Program to include 3rd grade as well.
- 2) A recommendation for future evaluations would be to investigate the wide discrepancy between the two schools on their ratings using teacher focus groups.
- 3) A recommendation would be to see what assistance could be given to the schools in developing partnerships.
- 4) A recommendation is to see if district personnel can assist in “speeding up” some of the projects that will facilitate the schools in being environmental education magnets.
- 5) A recommendation would be to continue assisting and developing the stewardship projects.

Reference

Field, A. (2009). *Discovering statistics using SPSS (3rd Ed.)*. Los Angeles: Sage.