Abstract

SIX MONTHS AS AN ENVIRONMENTAL EDUCATOR AT THE CINCINNATI NATURE CENTER

By Valerie C. Horobik

This paper describes the author’s experience as an environmental education intern at the Cincinnati Nature Center in Milford, Ohio, from June 6\textsuperscript{th} to December 17\textsuperscript{th}, 2005. This internship was undertaken as a fulfillment of the research requirement for a Master of Environmental Science degree at Miami University. As an intern, the author spent three months as a nature camp educator and three as a general environmental educator at the center. During the latter three months, she taught a variety of lessons to school groups and scout groups, created and presented a volunteer workshop, redesigned an exhibit, created an early childhood game, and contributed ideas to many other projects. The following paper discusses these achievements and their relationship to the author’s goals and to the curriculum of the Institute of Environmental Sciences.
SIX MONTHS AS AN ENVIRONMENTAL EDUCATOR AT THE CINCINNATI NATURE CENTER

An Internship Report

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I. INTRODUCTION

IES Requirements:
In addition to general requirements listed in the Miami University Graduate Student Handbook, students seeking a Master of Environmental Science degree are required to complete a six-hour research requirement. To meet this requirement students must complete and orally defend a thesis, internship, or practicum.

Selection of Internship:
I chose to complete an internship to fulfill my research requirement. The internship experience involves a commitment of at least six months to a sponsoring agency involved in interdisciplinary environmental activities. During this experience the student typically works full-time, submitting progress reports. At the internship’s completion, a final report, such as this, summarizing training received and work done during the internship is to be filed with IES (IES Graduate Handbook 2002).

I interned from June 6th to December 17th 2005 as an environmental educator at Cincinnati Nature Center (CNC) in Milford, Ohio. While an environmental education internship may not seem typical for a student within the biological conservation area of concentration, I feel that education is an essential part of conservation. This connection was best expressed by Baba Dioum, a Senegalese environmentalist, who in 1968 said “In the end we will conserve only what we love. We will love only what we understand. We will understand only what we have been taught”. My original direction upon entering IES was toward employment in applied wildlife conservation; however, experiences during my two years in the program increased my interest in educating and inspiring passion in people as a way to conserve wildlife and the environment in general. Because this path seemed to best suit my strengths and my passions, I decided to follow it in selecting my internship organization. The specific duties and personal goals for my internship will be further discussed in section III.
II. CINCINNATI NATURE CENTER

Organization History:
Cincinnati Nature Center (CNC) is a non-profit environmental education organization whose funding is provided mainly from memberships and donations. The organization got its start in 1965 when a group of 13 naturalists, led by Stanley Rowe Sr., started an organization for people to experience, study, and enjoy the natural world. The original site for the center was Rowe Woods, near Milford, Ohio. In 1972, a second plot of land, Long Branch Farm, was donated near Goshen, Ohio. This donation was followed in 1995 by a third area, Gorman Heritage Farm, near Evendale, Ohio. The latter property was closed to the public in 2003 due to budget constraints, leaving the current nature center with two properties (Appendix A), which are discussed individually below. Today, the acreage of those two properties totals over 1,600 acres of natural and agricultural land, including a nature center and 22 miles of hiking trails. CNC has the distinction of being one of the top ten nature centers in the country (CNC 2005).

Rowe Woods:
The seed land for CNC was acquired in 1965 following the deaths of Carl and Mary Krippendorf. Carl was born in Cincinnati in 1875, the son of German immigrants. As a child he became ill with typhoid, so his parents sent him to live with a doctor in the country, near Perintown, Ohio. In 1898, Carl purchased 97 acres of the country land that he had come to love in order to preserve it from tobacco cultivation. He and his wife Mary built a large house and lived there for 64 years. Following their deaths in 1964 and 1965, CNC acquired their well-preserved land, and named it Rowe Woods. The original Krippendorf buildings still stand within Rowe Woods, and many surrounding flowers and trees exist because of bulbs and seeds planted by the Krippendorfs (CNC 2005).

Over the past 40 years, additional land has been added to the Rowe Woods site, which is located six miles east of Milford, Ohio. The location now boasts 1025 acres of eastern deciduous forest, field, stream, and pond habitats through which 18 miles of trails wind. This site is the location of the Rowe Visitor Center where many school and public programs are held and where the nature shop and library are located. Krippendorf Lodge
is open for special events and is often rented out for weddings and receptions, with the proceeds benefiting CNC (CNC 2005).

**Long Branch Farm and Trails:**
The second CNC site, Long Branch Farm and Trails, was donated to the organization in 1972 by Neil and Donna McElroy. Having grown up in the Cincinnati area, Mr. McElroy was absent for a number of years to pursue various career endeavors, including a stint as Eisenhower’s Secretary of Defense from 1957-1959. Upon his family’s return to the Cincinnati area, the McElroy’s purchased Long Branch Farm near Goshen. Just over a decade later, the McElroy’s donated their farm to CNC with the request that it remain a working farm “in connection with educational activities” and that it be “kept intact in order to preserve wooded areas, flowers, and its natural beauty” (CNC 2005).

Today this 582-acre plot of agricultural and natural land is used as a teaching tool. Visitors learn about livestock, sustainable agriculture, fossils, and much more. The site contains pastures, meadows, woodlands, and crop fields that utilize sustainable farming practices. Visitors can hike the four miles of trails located at the property, or they can attend programs such as summer camps held here (CNC 2005).

**Mission:**
The mission of CNC is “to inspire passion for nature and promote environmentally responsible choices through experience and education” (CNC website).

**Principles of Education:**
CNC adopted five “Principles of Education” in 1999 as part of a 5-year education master plan. These principles were most recently revised in 2005 and are as follows (taken directly from CNC 1999):

1. **Teaching People to Think (What we teach):** CNC educators attempt to inspire visitors to think critically and act responsibly to support a healthy environment by aligning their actions with their values and committing to lifetime learning. CNC educators seldom teach a “right” answer about an environmental issue because, although they attempt to stay abreast of current
research, issues are often too complex for simple answers. Rather, the intent is to educate people to make their own “right” choice.

2. **Promoting Environmental Education (Why we teach):** CNC’s programs and curricula are based on the goals of Environmental Education as defined by the Tblisi Declaration, the Belgrade Charter, and the U.S. Environmental Protection Agency. These goals are intended to create an environmentally literate citizenry through a progression of awareness, knowledge, values (passion for nature), skills, and action (responsible environmental choices). Sustainability, as defined by CNC’s “Principles for Making Environmentally Responsible Choices”, is incorporated where appropriate as an educational theme. In addition, we strive to address concerns over the “Extinction of Experience” in today’s society. To this end, all off-site or in-school programs include incentives and encouragement for audiences to visit CNC sites.

3. **Using Interpretation to Teach (How we teach):** CNC uses the Principles of Interpretation (National Association of Interpretation) in all educational endeavors. All staff educators are committed to becoming certified interpreters. CNC programs are taught in small-group settings when possible so that all participants receive “hands-on” experience in the outdoors. Both staff-directed and self-led opportunities are provided. CNC educators strive to address the values, intellect, and senses of each participant; and they continually evaluate and improve their programs and services based on customer feedback, new trends in the field, and acquired knowledge and skills.

4. **Providing Diverse Outdoor Environments (Where we teach):** CNC believes the best environmental education occurs in bio-diverse outdoor settings. Visitors should be exposed to and educated about the wide continuum of interactions humans have with the natural world, from managed farmland to suburban yards to nature preserves. By emphasizing interconnectedness, CNC promotes the three components of sustainability – Environmentally Responsible, Financially Viable, and Socially Equitable. Farms, gardens,
other cultivated environments provide settings for hands-on experiences while demonstrating human dependence upon “The Land”.

5. Reaching Children and their Families (Who we teach): CNC believes that children have the highest priority among all CNC audiences, because we have an opportunity to influence and inspire their environmental values at an early age. These leaders of tomorrow are in need of frequent, positive outdoor experiences today. CNC alone cannot provide sufficient outdoor experience for every child, but it is possible to educate and encourage families to take this step for their children.

Programs Summary:

CNC programs range from hour-long programs to two-week-long safaris. Their target audiences range from one year-olds to senior citizens, and the diversity of programming is great. Recurring theme hikes include full moon and bird walks, while a list of annual events would contain “Salamander Celebration”, “Woodcock Watch”, and “Maple Syruping” to name a few. In addition, CNC hosts a number of program series from a preschool class that meets multiple times weekly to a Boomers and Beyond (senior citizen) group that meets monthly to socialize and learn about nature-related topics. During the summer, CNC hosts summer day camps for children ages three to twelve, including a nature art camp, animal-themed camps, and general nature-themed camps. When school is in session, CNC is especially busy booking school groups that come to the center for a variety of lesson plans. Each year CNC’s hands-on education programs reach over 12,000 children (CNC 2005). Finally, adults may take advantage of naturalist-led safaris that venture anywhere from Lake Erie to Africa! The CNC education team is constantly planning for future education programs, with those mentioned here being only a small proportion of the programs that occur in a given year.

III. INTERNSHIP SPECIFICS

Internship Duties:
The duties of an education intern at CNC are broad and can include as many experiences as one is interested in acquiring. The center advertises their internships as a good
experience in environmental education and interpretation for those wanting to enter the field or just “test the waters”. CNC interns become an important component of the education team and “function as much like regular staff as they are capable of handling”. Prior to beginning my internship, I was presented with the following paraphrased list of potential job duties that might arise (for full list, see Appendix B).

- Teach or assist with a variety of lessons for school groups
- Assist with revision or development of lessons for school groups
- Oversee the entire teaching day
- Assist with and help plan large public events
- Assist with the development and implementation of a public or member event
- Take part in education orientation for new teaching volunteers and interns
- Be formally evaluated on group management and teaching techniques
- Assist with planning/presentation of volunteer workshop(s)
- May have the opportunity to attend conferences

In addition to the above, I extended my internship beyond the typical spring or fall session to include a summer of teaching day camps at Long Branch Farm and Trails. My duties during this portion of my internship were to:

- Attend a week of training prior to the beginning of the camp season
- Teach short, hands-on lessons on a variety of agriculture and nature topics
- Engage children in recreational activities such as games or creek walks
- Monitor children in small and large groups to ensure safety and inclusion
- Handle and care for livestock

**Hierarchy of Positions:**

CNC is led by an executive director, Bill Hopple, below whom are directors of specific aspects of the CNC mission. The director under whom I worked was the education director, Connie Brockman. Her job is to oversee the education team of which I was a member. Other members of the education team were the assistant education director, chief naturalist, environmental educators, education administrative assistant, artist and exhibits manager, early childhood programs director and specialist, and the other environmental education interns. As an education intern, I reported to Jason Neumann,
the assistant director of education. In addition to regular staff, a board of trustees oversees the operations of the center.

**Internship Goals:**
In choosing to intern at CNC, I had one broad goal, which was to gain more experience in the environmental education field to help me decide if this was the career path I wanted to follow. However, having had some experience teaching at the Cincinnati Zoo and a nature center in Wisconsin, I was fairly certain that at the end of my internship I would want to seek employment in the environmental education field. Thus, I set two more specific goals, tailored to what I felt were my weaknesses as an educator going into the internship. The first of these goals was to challenge myself creatively with exhibit or program design, something I have had no experience with. The second was to improve my group management skills as an educator.

**IV. FULFILLMENT OF INTERNSHIP**

**Summer Session:**
During the first half of my internship, I served as an environmental educator for Cincynature day camps at the farm site. The following sections will chronicle my experiences as a camp environmental educator during the summer of 2005.

**Training**
The week of June 6th to June 10th was spent in staff training to prepare for the upcoming nine-week session of Cincynature camps at Long Branch Farm and Trails. This training session included group building activities among the ten staff members who ranged in age from nineteen to the mid-thirties. We worked to solve challenges and designed puppet shows and games for the upcoming weeks of camps. We were trained to care for and handle the farm livestock, which included pigs, rabbits, chickens, sheep, goats, cats and a steer; also, we were trained in how to let the children interact safely with the livestock. Finally, we reviewed the activities for the three different camps we would be teaching. These activities included cooking with the children, operating some simple
farm equipment, playing games, and doing nature-related activities. Additionally, we spent a day with the volunteer coordinator during which we reviewed first aid procedures and discussed how to handle assorted problems or situations that have arisen or could conceivably occur with campers or parents. During this week of training the staff learned that we would be teaching in pairs (for safety reasons), with a maximum of 10 students per group.

Farm Camp
During the summer, four weeks were dedicated to Farm Camp, a shorter camp held from 9:00 AM to 2:00 PM Monday through Friday. The same children attended the camp all five days of the week in which a session was held. The sessions for this camp began on June 13, June 20, July 18, and July 25. The target age group for this camp was five to nine year olds, though the camp was attended by some children four, ten, and eleven years of age. Camp attendance ranged from 30 to 47 children for this camp.

The camp schedule was the same each week (Appendix C). Every morning the staff members walked down a hill to the parking lot where parents would arrive to drop off their campers. Two staff members would be in charge of sign-in, which was required, along with sign-out, every day. One staff member was in charge of the gate, ensuring that only children who were signed in could enter. Two more staff members were in charge of games to keep the children who had arrived safe and occupied in one group. When all children had arrived, they were transported up the hill in two large wagons pulled by tractors. On Monday, once at the barn, camp’s home base, the children gathered in one group with staff members for an introductory puppet show. The show, designed by staff, covered what to expect, behavior rules, and some general livestock rules. Following the skit, children were assigned to groups and staff members based mainly on age, with similarly aged children grouped together when possible. On future mornings, upon arrival up the hill, the children went directly to their group’s “base”. Every day of the week each group was given a particular schedule; the schedules rotated between groups so that each group did all activities by week’s end. The mornings always began with a short game, followed by morning chores for which each group was in charge of one of the farm’s animals. While taking care of their animal, the campers
were taught about it, including its digestion and any unique facts. Next was lunch, followed by an active game. Following lunch, the campers had two afternoon activities such as catching and studying insects, studying the honeybees and tasting assorted honey, learning about and grinding corn, or taking a stream expedition to catch crayfish and invertebrates, to name a few. Every day ended with each camper telling his or her favorite part of the day before we walked down the hill to meet the campers’ parents. The only difference in the week was on Friday, when the second afternoon activity for all was a “Barnyard Olympics” consisting of a variety of games created by staff, followed by a farm tour with the campers’ parents or other guests.

**Summer Memories**

Four additional weeks of camp consisted of a longer camp, intended for ages six to twelve, called Summer Memories. This camp ran from 9:00 AM to 4:00 PM Monday through Friday and was attended by several five-year-olds in addition to the suggested age range. Attendance ranged from 39 to 45 campers for the camps held the weeks of June 27, July 11, August 1, and August 8. The format of this camp (Appendix C) was very similar to that of Farm Camp with the morning beginning with greeting the campers and transporting them to the barn. All activities were performed in groups, with all groups rotating through activities to complete each one by week’s end. Because of the longer day, there were more activities each day, and the campers made a snack in the afternoon, usually related to one of the day’s lessons. The typical Summer Memories Day began with a game and animal chores, followed by the morning “Big Event” which could be fort building, observing baby chicks, or learning about camouflage with an advanced game of hide and seek, to name a few. Lunch was next, followed by an active game and then the PM “Big Event”, which might be a creek romp, a trip to the paw paw patch, or canoeing. After working up an appetite, homemade snacks included soynuts, soft pretzels, or cornbread. Extra time throughout the longer days was filled with reading books or creating our own stories, berry collecting, visiting animals, putting on camper-produced puppet shows, or other such activities. This camp utilized both the barnyard side of Long Branch, as well as the “Creekside”, which includes four miles of trails, two creeks, and a pond, as well as another barn that was “home base” on that side. Therefore,
extra time could always be filled with exploring as well. Summer Memories days concluded in the same manner as Farm Camp, with a sharing time and return of the campers to their parents.

First Farm Discoveries
This four-day camp, held from July 5 to July 8, was for three and four-year olds and lasted only two hours, from 9:30 AM to 11:30 AM. Only about 20 children attended this camp, so groups of approximately six children were accompanied by three educators. The mornings began with a half hour of free playtime at “centers”, set up around the room, that were related to the day’s topic. For example, on sheep day the children could “shear” a cardboard sheep or spin wool and play knit. They could also play with a plastic barn and animals or paint with a wool paintbrush. This time helped the young children adjust to being in a new place, away from their parents. Following station time and a brief introduction and puppet show, the children, in their small groups, rotated through three activities: a game, story and snack, and a trip to see the animal of the day. The themes for the week were sheep, rabbits, cows and tractors.

Reflections on Summer Camp
Teaching nature-related summer day camps was a fun experience. It was nice to have the same children five days in a row so that, as staff, we had more chances to reach them or spark their curiosity in some of the nature-related topics. It was great to teach hands-on activities such as photosynthesis role-playing in a giant plant cell, learning about pollination with stuffed bees, a bee costume, and a giant flower, or grinding our own corn for cornbread and learning about all of corn’s uses. It was an eye-opening experience in terms of realizing how creative environmental educators can be! I only hope that someday I can invent fun and engaging, yet highly educational, activities such as those I experienced at camp. I also thought it was great that the children got to interact with the livestock and learn respect for the animals in doing so. Having live animals to spend time with every day is certainly a unique experience for day camps. When I signed on to teach camps at the farm site of CNC rather than the more traditional nature center site, I was somewhat nervous that the topics would not really be environmental; however, I was
pleasantly surprised. I definitely realized that agriculture is as much learning about the environment and ecology as spending time at a nature preserve. We covered stream quality, pollination, plant diversity, animal identification, wise use of resources, recycling, and many other topics.

While I did truly enjoy teaching camps at Long Branch, I also realized that while I love environmental education, teaching camps for a lifetime would not be for me. Group management was, at times, challenging with so many children in one place and no parents or teachers present who are typical full-time authority figures. Likely I will get more used to these types of challenges as I pursue additional environmental education opportunities in outdoor, unstructured settings. However, as a first experience, it was occasionally overwhelming. Also, I would rather do full-time environmental education as opposed to having so many purely recreational activities such as fort building, canoeing, and game playing included.

Another realization that I had was that I enjoyed working with the older children (five years and above) much more than working with the three and four year olds. The preschool children require a whole different set of skills. Many of them are frightened to be away from their parents; some cry or refuse to talk. The camp with them was spent mostly playing and trying to keep their short attention spans occupied, with actual teaching being minimal. As a first experience with preschoolers, I found them as a group to be quite unnerving despite their small size! Thus, it seems I would prefer teaching school-aged children in the future. These realizations, as well as the enjoyable ten weeks spent outdoors gaining new teaching experiences and skills, made this portion of my internship well worth any difficulties encountered!

**Fall Training:**
For the fall portion of my internship, I was an environmental education intern stationed mainly at Rowe Woods, but also responsible for programming at Long Branch Farm and Trails. During the fall, I was one of four education interns. The following sections will chronicle the diverse experiences I had during this portion of my internship, from September to December, 2005.
**Orientation**

At CNC, the vast majority of school programs are taught by volunteer educators. The newest group of volunteers participates in an educator orientation and training each fall. Since this orientation session coincided with the first week of my internship, I sat in on the week-long session. Training sessions covered topics including field, forest, stream, and pond natural history, geological history of the area, child safety, philosophy of environmental education, and curriculum planning. I learned about effective education techniques, levels of questioning, tips for the trail, succession, identification of stream and pond invertebrates, common CNC trees, winter trees, flowers, and bird calls. In addition, some of the more seasoned volunteers shared some tips on interpretive technique and group management.

**Volunteer Workshops**

Nearly every Monday, CNC offers workshops for its volunteer educators and staff who wanted to attend. These workshops are sometimes presented by CNC educators and sometimes by outside speakers such as professors from universities. I was able to attend nearly all of these workshops during my time at CNC. The workshops I attended covered the topics of Paw Paws, the new “Forest Ecology” curriculum, Spiders, Native Shrubs and Vines, Brainstorming questions about the mission and future of CNC, Oaks, Small Mammals, and Genetically Modified Foods and the Environment. These workshops provided detailed information on selected topics, which was useful for sharing with student groups when the opportunity arose.

**School Programs:**

The majority of my internship involved teaching school groups that come to CNC to receive a hands-on outdoor experience that enhances their classroom curriculum. During the school year lessons are taught nearly every Tuesday through Friday. At Rowe Woods there are six lesson plans available for school aged children (I was not involved in early childhood programs), all of which address specific Ohio education proficiencies (Appendix D). Although the site is now closed, while I was interning, six additional
lesson plans were available at the Long Branch Farm site. For all programs, the school groups receive a large group introduction to the subject matter before being broken down into groups of eight students per CNC instructor for the outdoor component. The schools are required to provide a minimum of one adult chaperone per eight students, ensuring two adults per group. The following sections will discuss the training I completed prior to teaching lessons and will describe each lesson that I taught.

Observation
Prior to teaching any lessons I was required to observe several seasoned instructors. For each observation I completed a questionnaire called “What to observe as an observer” (Appendix E). This sheet directed my attention toward how the leader developed a relationship with and engaged the children, what effect the level of engagement had on the children, how the leader questioned the children, whether the children were comfortable and included, and other important teaching issues. I found this process very helpful in identifying group management techniques that worked or did not work, and I gained natural history knowledge from the leaders as well. After basic observations of the format of CNC lessons and interpretation, I began learning individual programs. I was given a curriculum manual with the Rowe Woods lessons, and I received a copy of the Long Branch lessons when I was prepared to learn each one. Typically I observed each lesson a single time before teaching it; however, occasionally I observed a lesson twice or co-taught with another instructor before teaching it independently. By the end of my internship I had taught nine different lesson plans between the two sites with students ranging from 1st grade through high school.

What’s For Lunch?
The goal of this lesson was to reveal living examples of food chains within a variety of local habitats, and to have the children understand how food chains and communities are influenced by change. This lesson was recommended for 1st through 5th grade students. The learning objectives for this lesson were that through experience the students would:

1. Describe the role of producers in energy transfer (food can be traced back to plants).
2. List examples of food chains/webs involving producers, consumers, and decomposers.

3. Provide examples of physical/behavioral adaptations, which allow organisms to fill a niche within a variety of local habitats.

4. List examples of how organisms, including humans, change their environments and respond to changes within their environments.

In teaching this lesson, I began with an observation activity in which I covered up a variety of objects with a bandanna, giving the children about three seconds to look at them before recovering them. I then had the children remember everything they could about the objects, tying this into the importance of making quick observations in nature because objects are not always stationary. We also discussed how many small or camouflaged things go unnoticed. Following this activity we took a hike in which we identified living things as producers, consumers, and decomposers, identifying any adaptations those organisms had to help them obtain food or avoid being food. During our hike I always visited a fox den that used to be a woodchuck hole, and we discussed food chains or webs at that location. Throughout the hike I utilized filler activities for the lesson, provided by CNC. These included making a food web with a ball of yarn and organism name cards, playing a predator-prey game, and role-playing birds seeking hidden yarn “caterpillars” to illustrate camouflage’s role in protection from predators. Finally, I included a visit to the early 19th century cabin on the property for a discussion of predators that used to live in Ohio and the reasons they no longer do, bringing up the idea of change and human intervention.

Ohio Plants and Animals

The goal of this lesson, suitable for grades 1st through 5th, was to observe real-life examples of local plants and animals in various life stages. Its learning objectives were for students, through direct experience, to compare and contrast:

1. Three local habitats and some of the plants and animals that live in each.

2. Physical and behavioral adaptations of plants and animals that help them live within their habitat; life cycles for an insect, an amphibian, and a plant.
I would begin this lesson with the bandanna cover-up observation activity discussed above. Following that activity I would lead the children on an exploratory hike through three habitats: forest, field, and pond. In the forest habitat we would turn over logs to find organisms, while at the field and pond the students received containers to capture insects or macroinvertebrates and amphibians. Upon finding an organism we would discuss some of its adaptations. For example, backswimmers have legs like boat paddles. Often, I would have the children tell about the animal or plant they had found, during which they sometimes mentioned adaptations on their own. I also utilized plastic life stage sets to teach the children about a butterfly and frog life cycle, while we discussed plant life cycles in the field or along the path when the children discovered seeds. During this lesson plan, I often quizzed the students on the State plants and animals of Ohio, which they really seemed to enjoy. Sometimes we played the “Monarch” game that deals with metamorphosis or a leaf relay in which the children found matching leaves when one student held one up. This latter activity helped the children realize the diversity of trees in Ohio.

Pond Study
The goal of this lesson, intended for grades 1st through 8th, was for students to discover aquatic ecosystems and food chains via hands-on exploration of ponds, and for them to study diversity, adaptation, and interrelationships among the organisms they found. The objectives of this lesson were that the students shall:

1. Be able to discuss the differences and similarities between an aquatic and terrestrial ecosystem.
2. Become familiar with the variety of strategies by which animals and plants meet their basic needs for life in a pond.
3. Be able to observe several specific adaptations in organisms collected from the pond.
4. Be able to identify several pond organisms.

This lesson was pretty straightforward to teach. We went to three ponds in different stages of succession. We talked about pond succession and water quality (specifically organisms as an indicator of). Then the students used nets and buckets to capture pond
organisms for study. The students identified the organisms when possible and examined them for clues as to what they may eat and how they get around. Finally, we discussed the life cycles of several pond organisms such as salamanders, tadpoles, and dragonfly larvae, which live part of their lives in and part out of the water.

Rocks, Fossils, and Landforms

The goal of this lesson, intended for grades 4th through 8th, was to identify examples of erosion and deposition caused by the forces of nature, while reinforcing concepts of glaciation, soil formation and landforms. In addition, students discovered and identified Ordovician fossils and types of rocks at the stream. Objectives were for students to be able to:

1. Identify two processes that are going on today to change landforms.
2. List three examples seen at CNC where vegetation lessens the force of wind and water.
3. State three examples of ways in which people have altered landforms at CNC.
4. Identify, using their senses and various tests, three kinds of rock in the stream: limestone, shale, and glacial erratics.
5. Identify several of the common fossils in the stream and describe their origin.

This lesson consisted of a hike around the lake, identifying and marking areas of erosion and deposition on a map of the property, while noting areas where humans had altered the land. We also spent some time looking at a contour map of the property, using cardboard circles and loops on top of one another to illustrate the concept of the contours. We spent the remainder of the time at the stream, identifying Ordovician fossils, discussing their history, and going on a scavenger hunt to find shale, limestone, and glacial erratics. We discussed various properties of the different types of rocks, including their reaction or lack there of to acid, which we demonstrated.

Forest Ecology

The goal of this lesson plan, prepared for 4th to 6th grade students, was to investigate the biotic and abiotic components of an eastern deciduous forest and their functions and interactions. Learning objectives for this lesson were for students to:
1. Practice using a dichotomous key and gathering data using scientific instruments.
2. Learn to identify stages of forest succession.
3. Describe forest stratification and, in each stratum, identify representative organisms and their survival adaptations and interrelationships.
4. Identify several forest micro-habitats (rotting logs, leaf litter, tree bark, etc.).

This lesson plan was brand new this year; in fact, I helped revise and proofread it. It was a fun lesson to teach because it was for older children, often 6th or 7th graders, and it involved us going out and actually collecting some scientific data. I always began the day studying individual trees and their characteristics: bark, leaves, and other identifying characteristics. We completed a tree trail hike using a dichotomous key designed for that trail; it was a good group work activity to have the students identify the trees on their own after doing a couple of practice trees to help them understand the flow of the key. After that activity, we went to two sites in the forest – one in an early successional stage and one in a mature area. At each of these sites the students took measurements of leaf litter depth, canopy coverage, and plant diversity. They also made observations of organisms present in each stratum (including under logs or rocks), age of the trees, soil characteristics, and tree species present. We then discussed the reasons for the differences in sites, typical trees for the various stages of succession, and species of animals that prefer different ages of forest. If a younger group was doing this lesson, I would also do an activity called “Meet a Tree” in which the children pair off and one partner is blindfolded and led to a tree. That partner has to learn as much about that tree as he or she can with his/her hands. They are then led away, take off their blindfold, and have to guess their tree by sight only. This activity got the students thinking about identifying characteristics of trees and helped them realize all trees are not the same!

Life Needs
This lesson, taught at the Long Branch Farm site, sought to teach students what organisms need to live. Learning objectives were for students to be able to:

1. List the things plants need to live.
2. List the things animals need to live.
3. Explain how humans depend on plants and animals for their needs.
This lesson was taught from the perspective that the students were “investigators” making sure all of the livestock had their life needs (food, water, shelter, space, air) met. In addition, the children learned about photosynthesis through role-play. Finally, at each livestock station there was a box of products used by humans, all of which were derived from that animal. This activity helped the students understand that we utilize plants and animals to meet our own life needs. The target age for this lesson plan was 1st through 4th grade students, but it was usually taught to the lower end of this spectrum.

Manure to Muscles
This lesson, meant for grades 4th through 6th, addressed the concepts of food chains, nutrient cycling, and interrelationships. Its learning objectives were for students to be able to:

1. Understand that all food originates from green plants.
2. Explain that green plants convert CO₂ and H₂O to food using sunlight (photosynthesis).
3. Understand and give examples of producers, consumers, and decomposers.
4. Draw a food chain of which they are a part and discuss energy flow.
5. Trace food or clothing back to its original source on the farm.
6. Describe a way farm “waste products” are converted into resources.

This lesson was taught with hands-on activities at stations around the farm. Students spent the day collecting manure and other once-living things. At the end of the day these items were taken to the compost pile, where the process of nutrient recycling was explained, illustrating that the nutrients return to the food chain via compost being placed in the garden. At the compost pile, the students observed the increased temperature and looked for decomposers. During the day the students also learned about photosynthesis via element-labeled balls that connected via Velcro to form the proper combination necessary for plants to make food. At each animal station we traced its food chain back to plants and the sun. Finally, we led the children in a food chain race, in which “energy” had to be transferred from the sun to human consumption via two food chains of differing length. This activity illustrated the loss of energy between each of the stages of consumption. The lesson concluded with a review of the overall nutrient flow on the
farm, from the sun to the compost pile and back to the fields or garden and then to human consumption.

**Energy to Meet Our Needs**

This lesson plan, meant for 5th graders and surrounding grades, focused on sources of energy. Its learning objectives were for students to be able to:

1. Explain that heat is a flow of energy from warmer objects to cooler ones.
2. Identify the sun as the major energy source of planet earth.
3. Identify oil, coal, natural gas, propane, and nuclear as non-renewable energy sources.
4. Identify wind, solar, hydro, biomass, and geothermal as renewable energy sources.
5. Identify the positive or negative impact of the use of different energy sources.
6. Describe how people try to conserve energy in order to slow down the depletion of energy sources, save money, and/or reduce pollution.
8. Trace energy flow through a food chain.
9. Explain the general process of photosynthesis.

This lesson plan, like most taught at Long Branch, involved having the students rotate through stations where they completed hands-on activities. Throughout the day the group carried a set of cards – one for each energy source – that they matched to the proper station. At each station they had to decide if the source was renewable or non-renewable and what the pros and cons of its use were. The stations included teaching tools such as a solar oven, photovoltaic cell, solar radiation level maps for the country, a fire for demonstration of biomass as an energy source, wind gauges, hydroelectric dam model, geothermal energy demonstration, and raw materials of fossil fuels. We used animal examples for some energy sources, such as rabbits’ use of burrows being similar to geothermal heating of one’s home. We illustrated pollution produced by fossil fuels, and we role-played photosynthesis in conjunction with the discussion of biomass energy.
Global Classroom

This lesson, designed specifically for the 6th grade of CNC’s partner school in Goshen, sought to explore the causes and results of unequal resource distribution throughout the world, the impact of human activity on Earth, and human behavior such as war, gender roles, and family size as related to natural resources. The learning objectives were for students to:

1. Be able to list the basic life needs of all people.
2. Be able to explain that all resources come from the environment.
3. Be able to explain why “common” or shared resources are often depleted.
4. Examine the reasons and ethics involved with meeting one’s own short-term needs at the expense of long-term sustainability.
5. Be able to empathize with the plight of humans in other parts of the world.
6. Be able to demonstrate how inappropriate use leads to erosion, species extinction, and polluted water and air.
7. Be able to explain that higher population leads to discrimination and subsequent unrest/war.

This lesson was also taught with students rotating, in small groups, through stations with their leader. Some stations represented specific countries, while others represented concepts such as sustainability. At each country station, we examined a picture of an “average” family and their possessions and drew observations about their lifestyle. At the Ethiopia station we gathered firewood and dung, ground grain, and made an ethnic bread. At “Thailand” we discussed the importance of rice, pulled a plow, and visited the steer to learn about Brahma cattle. At the Haiti station, we gathered water from the pond, tried goat’s milk and traditional Haitian food, and discussed the importance of chickens as food in areas without electricity. Other stations included a “fishing for the future” game where the students operated candy fisheries and explored the idea of sustainability, a carrying capacity demonstration using buckets of water whose levels changed with birth and death rates, and an “ecological footprint” station with a human needs puzzle and facts on eco-footprints of different countries. This lesson plan concluded with the students as a large group illustrating the populations of the different continents versus resource and wealth distribution. The lesson was taught in such a way as to let students draw their
own conclusions, but they certainly walked away with an understanding that life is not
the same for people in other countries. The lessons taught by this program were fairly
profound for the students.

Ohio History
I did not get the opportunity to teach this lesson, as it was only offered one time during
my internship; however, I did observe it for a day. The goal of the lesson, meant for
grade 5, was to introduce students to Ohio history around 1790. The students traveled
back in time and met three characters (dressed and acting their parts fully): a settler, a
surveyor, and a Shawnee. Each of the characters had the students help them with a task
and/or told the students stories. The surveyor had the students help take measurements
and record information. The settler had the students help her gather herbs and firewood,
and the Shawnee told the students stories of her people. The educators never once
relented that they were not “real”, and they would refer to other events going on in the
area at that time, making it seem as if the students were really a part of that time period.
It truly was a lesson by immersion. I had never witnessed a program taught in this
manner; it was very unique.

Scout Programs:
In addition to teaching programs for school groups, I had the opportunity to teach badge
programs to three scout groups. These programs were typically two to three hours and
were fun to teach because the badge requirements (Appendix F) were clearly stated but
left flexibility as to how they were met.

Eco-Explorer
My first experience with a scout group was on October 18th, when I assisted with leading
a group of 13 Brownie girl scouts to meet the requirements for their eco-explorer try-it.
This badge, for children in grades 1st through 3rd, is met through a series of activities.
Some of the activities, such as speaking up for the animals, making a habitat, and helping
wildlife, were performed by the group at another time. The activities completed in their
time at CNC were: exploring nature, food chain, and what’s a habitat? To meet their
activity requirements, we led the girls on a two-hour hike, during which we visited and discussed field, pond, and forest habitats and microhabitats by looking for organisms in each of these. When we found organisms, we listed them and later created food chains involving the animals and plants we had observed.

Wildlife

On October 26th, I co-led a hike with another education intern for a group of nine Jr. girl scouts, meeting the requirements for their wildlife badge. Some of the required activities for this badge (meant for girls in 3rd through 6th grade) were:

1. Visiting a nature center and discussing how to manage land for wildlife.
2. Identifying the wildlife symbols for Ohio.
3. Identifying poisonous plants and where they are found.
4. Learning about endangered plants and animals in Ohio.
5. Learning to identify five species of a particular wildlife group and how they interact with their environment
6. Discussing careers in wildlife management and environmental education.

To meet these activity requirements, we began at the observation window in the visitor center. This window faces a bird feeder area where we could easily view five common species of birds, observing their field marks and behavior. After completing this activity, we embarked on a hike around Rowe Woods, meeting activities as we went. For example, when we got to a buckeye tree, we began quizzing the girls on Ohio’s wildlife symbols and showed them a picture or example of each. We pointed out areas of the property managed for specific animals or plants, such as the planted prairie habitat. We identified poison ivy along the trail and discussed other poisonous plants found in Ohio. In addition, we discussed the Karner Blue Butterfly and Indiana Bat, two endangered species that can be found in Ohio. Finally, we told the girls about our education and experience in environmental education.
Naturalist
On November 12th, I helped a group of five Webelo cub scouts receive their naturalist badge. This badge, meant for 4th to 5th grade boys, required that the boys complete four of eight activities. The activities to choose from were:

1. Keep an “insect zoo”.
2. Set up an aquarium or terrarium for at least a month.
3. Visit a museum of natural history, nature center, or zoo.
4. Watch for birds in your yard, neighborhood, or town for a week.
5. Learn about the bird flyways closest to your home.
6. Learn to identify poisonous plants and venomous reptiles found in the area.
7. Watch six wild animals and describe the kind of place where you saw them.
8. Give examples of a producer, consumer, and decomposer and how humans have changed the balance of nature.

We met requirements three and six through eight during the cub scouts’ visit. We hiked through three habitats – forest, field, and pond – and observed organisms in these habitats, marking them as producers, consumers, and decomposers on our record sheet. We went to the cabin on the property and discussed how the landscape used to look in Ohio and how settlers changed the land and plant and animal communities. During our hike, we identified poison ivy and discussed other poisonous plants in the area.

Awareness of Nature:
CNC hosts programs for various age groups on one Saturday of each month. The children that attend these programs are signed up to attend the four-month series, so they gain repeated exposure to the center. I assisted with the series for five and six year-olds, entitled “Awareness of Nature”. The program had a different theme each week: flowers, fall leaves, fossils, and animal tracks. The programs lasted two hours, with the first half hour dedicated to “station time” in which the children could play freely at stations dedicated to the theme. One of the stations was always a craft such as a fossil impression, flower door magnet, or tree illustrating all four seasons; others had play doh, books and puzzles, painting, and a touch table. Following station time, the children were
gathered for a group introduction in which we discussed the day’s theme. Then, they were split into groups of four or five children and led on a hike to explore the theme. Following the hike, the children returned for a quick snack and discussion of their findings.

My role in this program, for the first, third, and fourth weeks, was to help oversee the station time and sign-in, lead a group on their hike, and lead the conclusion with the children. However, in October the naturalist who leads the program was absent, and I was put in charge. On this occasion I coordinated the volunteer educators, set up and led all of the station activities, and did the introduction and conclusion. I enjoyed working with the five and six year-olds because of their endless enthusiasm for everything. However, the experience of leading the program in October was particularly valuable for me. I learned that being a coordinator means having to be prepared for the unexpected and being flexible. Several of the volunteers who were supposed to assist with the program that week failed to show up, so I had to make last minute adjustments in plans to accommodate the higher student to teacher ratio. The experience was also valuable because it allowed me to design my own introduction and conclusion for the children, which while brief, still allowed me to exercise a bit of curriculum design.

“Costumes of Nature”:
As previously mentioned, each Monday CNC held workshops on an ecology or education topic for its volunteer educators. Because the schedule was not completely full, I decided I would like to challenge myself by presenting a workshop. I proposed a workshop, designed for presentation around Halloween that was entitled “Costumes of Nature” and would focus on camouflage and mimicry, with special emphasis on local examples that could be used in teaching. The naturalists and volunteer coordinator were enthusiastic about the idea and gave me the go ahead to present my workshop on November 7th. They did ask that I give the other interns the option to be involved, so Heather Hahn joined me in the venture. Heather wanted to be involved in the workshop; however, she allowed me to design the presentation since it had been my concept. We then worked together to design activities to go along with the information we would be presenting. We agreed
that we wanted to present a dynamic, interactive workshop in contrast to the lecturing style utilized by many of the volunteers and naturalists at CNC.

In preparation for the workshop, I spent two weeks researching the different types of mimicry and camouflage and finding local examples of them whenever possible. I then prepared a 90-minute PowerPoint presentation (Appendix G) that illustrated the concepts and different types of mimicry and camouflage with many pictures and stories; the presentation concluded with a section on native examples in which the audience had to tell us which type of “costume” each example represented. We included a substantial amount of audience participation in our workshop, with games such as “which one is not a mimic?” My favorite activity, however, was a simulation that Heather and I adapted from an activity we found online, to illustrate the concept of Batesian mimicry. We had five colors of Skittles candy, representing six types of butterflies. The audience members were the predators of the butterflies, and it was up to them to try to avoid the “distasteful” and potentially poisonous ones. To represent the “distasteful” butterfly, unbeknownst to the audience, we had yellow sour Skittles mixed in with the regular ones. They looked slightly, but not obviously different from the regular yellow Skittles. Thus, the regular yellow Skittles would represent the Batesian mimic of the distasteful butterfly. We had several “hunting” seasons, in which the audience members selected a single “butterfly”. Then, we examined the distribution of butterflies remaining. The idea was that the sour Skittle (distasteful butterfly) was avoided, and by resemblance, the mimic (regular yellow Skittle) also had higher numbers remaining than the other types. The activity was a big success. As a final visual and comic addition to our presentation, whichever speaker was not currently talking underwent minor wardrobe or behavior changes to illustrate the type of mimicry or camouflage being discussed.

Following our morning presentation and question and answer session, we spent the afternoon outside illustrating camouflage activities that were already alternate activities for or could be added to CNC lesson plans taught by the volunteers. The first was an “unnatural trail” in which we hid objects such as string, golf tees, and felt squares along the edge of a trail, and it was the participants’ job to see how many they could identify after a few passes. This activity can be used as a lead-in to discuss why certain objects were harder to find, illustrating the components of camouflage. The second
activity was similar, but perhaps easier, for younger children. It involved placing a number of different colored yarn pieces (representing caterpillars) directly along the trail (equal numbers of each color) and having the participants (representing hungry birds) see how many they could find in a specified time period. Depending on the season (fall when we did the activity), the green or the brown “caterpillars” would be most difficult to find, illustrating camouflage. Since more camouflaged caterpillars “survived”, this is a good activity to demonstrate the adaptive nature of camouflage. Finally, we had our head naturalist lead us on a hike around the property to identify examples of mimicry or camouflage.

Twenty-three people attended our workshop, and we received many compliments on our presentation, especially about our dynamic and interactive teaching styles. Many of the volunteers mentioned that they had learned something new and that they would incorporate our examples into their lessons with school groups when the opportunity arose. I feel the workshop was a huge success, and of all the things I did during my internship, it is the accomplishment I am most proud of. It was a voluntary contribution to the center, and it was my first time designing a lesson from the idea stage all the way to its presentation. Designing activities for the workshop also required thinking creatively, something I had not had much experience with in past education positions. It was a challenging venture, but very rewarding upon completion.

**Discovery Corner:**

Another large project that I contributed to while interning at CNC was the redesign of an outside exhibit (Appendix H). The visitor center has a large covered porch outside its back door, and one half of that porch was lined by a table covered with objects from nature: wasp nests, rocks, fossils, bones, and many others. When I began my internship, the naturalists mentioned that the area hadn’t changed in decades, and it was obviously looking dingy. The covered porch made the area very dark, and leaves and debris had gathered among the cluttered array of objects that had been deposited on the tables over the years. In addition, what little signage there was needed to be updated and repaired or replaced. Seeing the disarray that the current exhibit was in, and realizing its potential as a teaching area, another intern and I decided to revamp the exhibit.
To begin our project we first consulted with the staff naturalists and artist in residence who is in charge of exhibits. We inquired as to the original purpose of the space and were told that the vision was for it to be an area for hands-on exploration of objects from nature. They wanted it to remain an area that needed a minimum amount of care in terms of objects having to remain in specific locations on the table. We proposed cleaning up the area and painting it a lighter color to attract more attention to it. Also, we wanted to remove some of the objects, as there were many duplicates, and many were broken. Most importantly, we envisioned making the area more educational by creating signage of a scavenger hunt sort – questions requiring visitors to locate a specific object – that provided additional information on some of the objects. Many staff members were extremely excited to hear of our plans since the area had been deteriorating for many years with no attention. However, we did have to alter some of our plans by request of the director of exhibits. Mainly, she would not allow us to paint the area with any type of bright color as we had envisioned; instead we had to settle for coloring the walls a lighter shade of tan. The experience of having to get everything approved and the lack of openness to change by some staff members were frustrating. However, in the end, most of our ideas were accepted, and we began work on the area in late September.

We began by sorting through the items on the tables, throwing out duplicates or broken objects. Then we swept and thoroughly cleaned the tables, floor, and bulletin boards behind the tables. We decided to loosely group the objects by similarities – rocks and fossils together, bones together, etc. When the objects were organized, we took an inventory of what remained and began creating questions and answers about those objects to be placed on signs. We designed the signs in a flip-up fashion, question on the front and answer on a second sheet that could be accessed by flipping up the front one. We made all the signs very colorful with pictures and graphics to attract attention; also, we had the questions span a range of difficulty to accommodate visitors of different ages. When finished, the 21 questions were pinned to the newly painted, lighter, bulletin boards over the tables. By using the scavenger hunt format for our questions, the area can remain low maintenance. With the objects not paired to questions, it will not matter if they are rearranged by visitors. Early in the planning stage we considered including a “What did you find?” section of the table, as people have historically placed objects from
the trail on the table. However, we decided against this addition because we did not want to encourage people to remove things from the center’s habitats or have the space end up terribly cluttered again.

The finished “Discovery Corner” looked brand new. The beige color, while not as bright as we originally wanted, still lightened up the area substantially, and the bright colors on the signs added to the effect. Within days of completing the corner we had received many compliments from staff, administrators, board members, volunteers, and patrons. The redesign was such a success that it will be featured in the spring edition of the CNC newsletter. It was a great creative experience for me to be integral in the redesign of such a large exhibit; I especially enjoyed creating colorful and informative signs for the area. I hope that our project will be educational and enjoyable for years to come!

**Other Education Projects:**
During my time at CNC I contributed to several other projects in varying degrees, from brainstorming to design to assembly. Below, I describe the more substantial projects I assisted with.

**Preparing For Night**
Each fall CNC hosts a large family-oriented event called “Preparing For Night”. The event occurs in the evenings and showcases things that are out at night: stars, nocturnal animals, and such. Since this event occurred the first weekend of my internship, I did not assist with much planning of the event; my role was mainly helping to decorate the “maze of darkness”. The maze is always one of the highlights of the annual event. The covered porch is surrounded with and segmented by huge black tarps, resulting in a dark maze with three rooms illuminated only by black light. Each of the rooms was decorated differently. The first was a solar system room. I created a to-scale solar system model for this room, using Styrofoam balls, wire, and fluorescent paint. I also decorated the ceilings and walls with glow-in-the-dark stars and planets. The second room had a simply silly theme – mirrors, flower pots, a clock, and many other black-light reflective objects coated the walls. I did some painting and design for this room. Finally, the third
room, which I also helped decorate, was the camouflage room. This room was coated on its floor, ceiling, and walls with fluorescent circular garage sale tags or “dots”. Then, a person in a black cloak, also covered head to toe in “dots”, stood against the wall in the room, unmoving. As people moved into the room, the “dot man” was camouflaged against the outer wall giving the illusion of an empty room. When the “dot man” began to move, it seemed as if your eyes were playing a trick on you. The maze was a valuable component of the event; it was very popular with children.

Although I did not get to contribute many ideas for the event this year; I did make a suggestion for next year’s maze of darkness. The maze has consisted of the same three rooms for several years now, and many patrons return yearly for this event. As a result, I suggested changing the rooms occasionally, so the maze stays exciting. I suggested a room for next year that features bioluminescence. It could feature animals such as fireflies and emperor scorpions, as well as some sea creatures that glow. Doug, who is in charge of maze design, loved the idea, but whether it will be incorporated into next year’s maze will remain to be seen. Many staff and board members like to keep things the same, so getting the maze changed may be a challenge.

Forest Ecology Lesson Plan
Over the last year, CNC has been reworking some of its school group lesson plans to fit the changing Ohio education standards, which have become important for schools to be able to get funding to take field trips. In addition, the education director has been designing the lesson plans to be more interactive and activity-based. At the beginning of my internship, the education department had finished the first draft of a new lesson entitled “forest ecology”. To test the activity portion of the lesson, a group of us went out and performed the field data collection portion as well as the proposed games and activities. We were asked for feedback on both the written lesson and the activities themselves. I assisted in the proofreading of the lesson plan, making grammatical and phrasing suggestions. I also made some suggestions for improvement of the data sheets for the field measurement portion. The sheets were inconsistent in their reference to specific things, which could have resulted in confusion. In addition, I suggested a different organization for the data sheet, with similar measurements grouped together.
My suggestions were taken, and we began teaching the forest ecology lesson plan in October. While I was not involved in the rewriting of the lesson from the beginning, it was nice to teach a lesson I had helped revise to a small extent. It was a good experience to see how the center goes about reworking curricula.

In addition to helping make final adjustments to the lesson plan, I assisted the education team in debuting the new plan to the volunteers. In particular, I was put in charge of illustrating how to use the scientific instruments like the densitometer, quadrant, diameter at breast height stick, and soil probe. Taking measurements and performing scientific studies were new to many of the volunteer educators, and I was surprised at how adamantly some of them opposed, even until the end of my internship, using “props” for teaching. I found the new lesson plan to be a welcome addition to CNC’s curriculum, allowing the students to learn about completing a scientific study, taking measurements, making comparisons, and drawing inferences. The hands-on activities are a great contrast to some of the older curricula that rely mainly on the leader talking to the children.

Oak Workshop

The topic of the October 17th volunteer workshop was to be Oaks, and we were expecting a guest speaker who was an expert on these trees. However, the presenter did not show up that morning, leaving our chief naturalist to come up with an alternate plan with little more than an hour’s notice. He decided to throw together an Oak workshop and asked me to contribute some information about tannins and the process of tanning leather using Oak tannins. I spent the next hour hurriedly researching the subject on the internet and taking notes. When presentation time arrived, I talked briefly about tannins’ purpose in trees and then discussed why they work for leather tanning and how tanning is accomplished. I was able to answer several audience questions, and one of the volunteers told me that I have a special ability to take complicated subjects and make them easy to understand. It was a great compliment, and the experience in giving an impromptu program segment was valuable. Another lesson gained from the experience was that it is vital to confirm with scheduled speakers!
Wildflower Workshop and Trail
After the number of school groups waned in the last three weeks of my internship, I assisted with the content of another volunteer workshop. In the spring of 2006, Jason, the assistant education director, is going to present a workshop on Spring wildflower folklore and hopes to also establish a self-guided wildflower trail using the information. I assisted in the preparation for this workshop by researching wildflowers from the CNC “Sequence of Blooms” list, recording interesting details about where their names came from, how they were used in the past, and how they may be used now. If all goes as planned, the information I gathered will serve as a basis for what will be presented in the workshop and included along the trail.

Early Childhood Education Game
In December, the early childhood educators were planning for their winter/spring preschool session and asked for some help designing and creating winter-themed games for the children. One of the games they requested was one focused on counting and learning the numerals 1-10. To meet their needs, I designed ten pairs of snowflakes with one of each pair having a numeral 1-10 and the other pair member displaying that number of colorful shape stickers. The game’s objective was for the children to match the two identical snowflakes based on the numbers of stickers matching the numeral, with the identical shape being a secondary clue. The game was used in the winter preschool session.

Wild Adventures Camp Planning
Near the end of my internship, Jason, the assistant director of education, was beginning to make plans for summer camp 2006. He is introducing a new camp this year, called “Wild Adventures”, which will have a wildlife theme. My role in this project was to help brainstorm and research hands-on wildlife activity ideas for children ages six to twelve. I conducted research mainly via the internet, but also in books of nature activities and publications of interpretive associations. One activity I suggested was a wildlife detective case where clues such as manufactured scat and tracks are placed, leaving the
children to solve a nature “who did it?” mystery. A couple other ideas were role-playing local wildlife such as creating groundhog tunnels using boxes or other building materials, and bringing in experts to talk about and show the children how wildlife are studied (track plates, mist netting, and such). Because of the ending date of my internship before camp plans were set, my contribution to this project consisted of brainstorming only, so whether any of my ideas will be used is unknown.

Sensory Trail
During the last week of my internship I was involved in the brainstorming and researching phase of another project, the proposed design of a sensory trail for special needs patrons. Whether this project will ever become a reality is unknown; it was only in the suggestion stage. To assist with this project, the other interns and I borrowed wheelchairs from the nature center and “drove” the all-person’s trail – the paved trail at CNC that would likely be altered to create the proposed trail. We undertook this outing to get a feel of what eye-level features could be highlighted, what hazards might exist, and what the perspective of someone in a wheelchair was. In addition, I began researching other sensory trails that had been created. Many of the ones I located were in South Africa and Europe, and they utilized the senses of touch and smell, as well as a layout that is easily maneuvered in a wheelchair. Finally, I also began a list of potential organizations that might serve as consultants for the project – local groups for the blind, disabled, and such. My research should serve as a good starting point for determining potential stakeholders and possible schemes for the trail. These latter two projects were good experiences, as they provided insight into what it is like to start planning a project from the very beginning.

Statistical Projects:
Near the beginning of my time at CNC, I was approached with the task of completing age distributions for summer camp attendance for 2005. I was chosen for the task because I had previous experience with Microsoft Excel, including creating tables and graphs and utilizing statistical functions. I returned a spreadsheet in which future camp attendance could be entered, as well as tables summarizing the data (Appendix I). These output
tables were used by both educators and administrators over the next few months, and they were presented and discussed at several meetings.

Pleased with my camp age distributions, in December the volunteer coordinator asked if I was willing to compile similar products for volunteer workshop attendance for the past five years. I enjoy working with numbers and graphs, so I eagerly agreed. I set up a spreadsheet with attendance data for the three CNC sites (some of the workshops occurred before the Gorman Farm site closed), spring vs. fall workshop series, and on vs. off-site workshops. I created graphs illustrating trends in attendance by site, year, and season. The staff members were thrilled with how easily the information could be both stored and displayed with Excel, so they asked me to show them how to use the program so they could continue to add to the spreadsheets I had created.

**Staff Meetings:**

While at CNC during the fall session, I was expected to attend all-staff and education department meetings. The next two sections will discuss the topics covered and my role at these meetings.

**Education Meetings**

Education staff meetings were held on a monthly basis and were attended by all naturalists, the exhibit manager, the early childhood specialists, interns, and the education administrative assistant. These meetings focused mainly on establishing the schedule for next years’ programs and volunteer workshops, selecting articles for the seasonal newsletter, and discussing completed programs. During the September meeting the longer-term staff listed all annual programs CNC holds, and we preliminarily discussed which ones to repeat in 2006 based on their fulfillment of “high income”, “high mission”, or both. During the October meeting, we finalized plans for these events by setting the dates on the master calendar and assigning who would lead the programs. Finally, the November meeting focused on selecting volunteer workshops for the spring and fall of 2006.

Because I would not be at CNC in 2006 and had not been there long enough to witness many of the programs, my input at the meetings was limited. However, my
contributions were valued as if I were a full-time staff member, and I did contribute suggestions and opinions. The biggest suggestion I had was to include some volunteer educator workshops that dealt with teaching or group management techniques and incorporating hands-on activities rather than having all of them focus on nature-related themes. Several of the younger staff members thought this was a great idea because they see what I see – that many of our volunteers are older and teach almost entirely by talking at the kids. What was interesting was that a debate of sorts broke out between one of the older naturalists, who thought the center did not have a problem with volunteer teaching quality, and the youngest naturalist, who insisted that there was always room for improvement. In the end, a compromise was reached, and while we will not be having workshops on teaching techniques, each workshop will begin with the review of a single activity or technique that can be used with one of our school group lesson plans.

All-Staff Meetings
I was present at CNC during a time of change with the Long Branch Farm site closing in November. Because this was such a substantial event, it was the focus of two of the three all-staff meetings I attended. Long Branch was temporarily closed due to declining school group attendance and high financial cost. CNC considers it a temporary closure, but is unsure of what to do with the site. As a result, we spent both the September and October meetings brainstorming future uses of the site. At the first meeting we did so as a large group, via index cards, while at the second meeting we broke into small groups and made more detailed suggestions. It was intriguing to be included in these open brainstorming sessions and to hear some of the volunteers’ (who were also invited to these specific meetings) opinions on the topic. Many people do not consider the farm to be “true nature”, so they consider it unnecessary. The opinion I shared was that having taught out there, I see it as a very valuable place that can be manipulated and used for hands-on interaction with nature, whereas the Rowe Woods site is meant more as a nature preserve where things must be left as-is. Suggestions for the future of the farm ranged from selling the land to reopening it in future years in varying capacities to letting people garden or keep livestock there. It is still very early in the process, so no decisions were reached by the end of my internship.
The third staff meeting I attended focused on what constitutes a successful program. We again split into small brainstorming groups and discussed trade-offs between income and impact and ways to evaluate programs’ success. Some suggestions were through number of people reached, repeated exposure of the same individuals, lasting impression, and income generated. In trying to plan for the future both financially and in terms of meeting the mission of the organization, CNC is asking big questions like this and seeking the input of its staff, board, and volunteers. Brainstorming sessions, such as those I attended, were ways to hear everyone’s opinion on equal ground.

**Public Representation of CNC:**
While at CNC, I had the opportunity to represent the organization at two public events. One focused on public outreach, while the other involved networking with other area environmental educators.

**Miami River Celebration**
In October, I, along with the other interns, took a booth to the Miami River Celebration in Loveland. This event highlighted environmental organizations in the area. My roles at the celebration were answering questions about CNC to the general public and providing information on programming and upcoming events. Regardless of the very chilly day, we estimate that about 150 people visited our booth during the day. Many were already members, which was to be expected at an event targeting environmental issues and organizations. Many of the attendees were, of course, environmentally conscious, and thus already aware of CNC and the other organizations. However, we did meet a good number of people who were not aware of the nature center or its programming.

**Greater Cincinnati Environmental Educators Consortium**
My second representation of CNC was at the November Greater Cincinnati Environmental Educators (GCEE) meeting at Winton Woods. GCEE consists of over 25 agencies, organizations, and non-profits that meet quarterly to update one another on new and ongoing projects. In addition, they sometimes collaborate to sponsor events. Attendance at this particular meeting was poor with Imago, Hamilton County Park
District, and the Cincinnati Zoo being the only other organizations represented. Thus, business was limited. During the meeting we provided information on the Richard Louv event, which was to be sponsored by CNC in February, and we discussed the possibility of collaboration. Then, other members reviewed the environmental educators’ fair held at the zoo the previous summer and discussed upcoming events that presented an opportunity for environmental education booths.

**Performance Review:**
At the end of November I underwent an evaluation by Jason, my supervisor. This consisted of him following and video taping me for an entire day of teaching. Then we watched the videotape together and discussed areas for improvement, areas I’m not fully comfortable, and things that I do well. I was leery about the video camera when he explained the process, so it was a nerve-racking day. However, I had never gotten the opportunity to see myself teach before, and I did notice things in the video I would not have noticed otherwise. I noted that the only area in which I did not feel fully comfortable was group management, and Jason suggested that it wasn’t as big a problem as I feel it is; however, he suggested some techniques I might use rather than verbal cues. He complemented me on the quality of questions I ask the children and my use of questioning overall while teaching. The review was a positive experience; it was good to get positive feedback and constructive criticism from a seasoned educator.

**V. REFLECTIONS ON MY INTERNSHIP**

**Fulfillment of Goals:**
At the beginning of my internship, as previously mentioned, I had two main goals: to challenge myself creatively and to work on group management skills. I far surpassed what I planned to achieve in terms of my first goal. I was involved in and initiated several creative endeavors at CNC, including creating and presenting an innovative volunteer workshop, redesigning an exhibit, helping with curriculum and program design, and creating an early childhood game. In addition, every day of teaching assorted lesson plans to different groups enhanced my creative abilities. No two groups are the same, so
flexibility and innovation in teaching techniques were essential. In terms of the second goal, while my success in that realm is not as apparent in the reading of this report, I did gain plenty of group management insight from observing volunteers and staff members, and through a process of trial and error while teaching. I walk away from CNC with more confidence in this aspect of educating, though mastering group management will undoubtedly be a career-long process.

Observations of CNC Practices:
While at CNC, I was able to gain insight into the inner-workings of a large nature center, and some of these observations left lasting impressions or questions in my mind. One thing that stuck out at me immediately was the tremendous commitment and number of volunteers at CNC. Nearly all school lesson plans are taught by volunteer educators of various ages and backgrounds. Since these programs occur on nearly every Tuesday through Friday during the year, requiring about eight volunteers per day, this is pretty impressive. There are over 300 individuals that volunteer their time to teach at the center and go to training and workshops. I am not aware of any other organization that has such a large and essential volunteer base.

A second observation that I made was that there are many different attitudes and teaching styles exhibited by the CNC educators. As I mentioned, the volunteers spanned a large spectrum of age and career, and their outlooks on environmental education were just as diverse. For example, CNC is currently overhauling much of its curriculum to better fit education standards for the state of Ohio. In doing so, many hands-on activities have been introduced into the lessons. Many of the volunteer educators, and a few staff members as well, constantly complained about having to include “props” or meet education standards. They often explicitly stated or implied that their preferred teaching style was to talk at the kids, rather than ask them questions or do activities with them. This style tends to conflict with that of some of the younger staff, as well as with the newly required curriculum standards that coincide with the state education standards. My outlook on the situation is that it is unfortunate that the center must so closely mold their lessons around the state standards in order for schools to be allowed to come; however, I do think the diversity of activities being included in the current lessons are an
improvement. I personally love teaching hands-on activities; they seem to leave more lasting impressions on the students and certainly hold their attention for longer. Also, these types of activities allow them to be more involved in the learning process. It was a great comfort to have a variety of games or activities in queue for each lesson, to be utilized if desired, based on time constraints and group dynamics. Not all groups are interested in the same things or have the same energy level, so it seems like a good idea to have alternate activities and plans, rather than being set on one particular method. That said, I must acknowledge that students who went out with volunteers with the aforementioned “anti-activity” attitudes did seem to have fun and learn plenty. Thus, I still ponder over whether there is a “right” way to teach.

Finally, being involved in all-staff meetings and discussions about the future of CNC, I was able to make a couple of observations regarding the running of a large nature center from an administrative perspective. The first, which became obvious with the closing of the farm site, is that money is always an issue. It comes into play in determining which programs to continue and how to manage the sites. While the nature center would love to consider nothing other than how to best fulfill its mission, income and finances have to be considered alongside and balanced with the fulfillment of the mission. Unfortunately, this results in cancellation of some programs or even closing of some sites that may have high potential for reaching people. This was a sad realization to make. I did find it very interesting though that the administration of the center considers, on a staff-wide level, such big questions as what to do with its sites and how to measure the amount of impact programs have on visitors. Bringing up these types of questions resulted in some very philosophical and valuable dialogue about environmental education and knowledge in general.

My final observation of the center was that politics certainly come into play in the running of the center. The number of stakeholders in any large CNC decision – between the board members, staff, volunteers, patrons, school teachers, and surrounding land owners – was immense. Even making a small decision, such as what color to paint an exhibit’s walls, required consulting and convincing many people. Thus, making a huge decision, such as what to do with the Long Branch site, will inevitably take a considerable amount of time and energy.
**Relationship to IES Core Curriculum:**
Several times throughout my internship I found myself marveling over the similarity of my thought process to the IES problem solving process that we are tested on during our comprehensive exams. Whenever I began a new project from scratch such as redesigning the exhibit or beginning to plan for camp or the sensory trail, I found myself essentially going through the steps of the process, though not explicitly. When presented with a daunting task, it was helpful to step back and consider the goal, objectives, and tasks that would lead to the problem’s solution. In addition, repeatedly throughout my internship, I found myself reflecting on the number of stakeholders that were or should be included in CNC decisions, a lesson that was emphasized during the problem solving process. Finally, the experience of working in a group during the public service project segment of the IES curriculum undoubtedly helped collaborative projects run more smoothly.

**Conclusion:**
During my time at CNC, I had the opportunity to take on many roles, gaining a wealth of good experiences, knowledge, and confidence. I was able to witness varied teaching techniques while honing my own. I was exposed to diverse environmental education curricula, including agricultural, global, and more traditional slants. I was involved in brainstorming at the educational department and all-staff levels, gaining insight into decision-making in a large environmental organization. In addition, I represented the organization at public events and events held at the center. I prepared and presented a volunteer workshop, completed research for additional workshops, contributed to exhibit and curriculum design, led a weekend program, and completed statistical reports for the center.

My six months spent at the center have helped to reassure me that education is indeed the career-path I want to pursue at this time in my life. I feel that environmental education is a vehicle through which I can truly contribute to conservation. Through education, I get to reach many people of all ages and hopefully spark that sense of curiosity that is an essential first step toward caring about something. I already knew that I enjoyed teaching in non-formal settings such as the nature center, but my time at CNC
did something very important for me. During my time at the center I learned that I can do more than teach. I have learned that I am capable of designing lessons and activities as well, something that I was unsure of previously, and that will give me more confidence to pursue higher career goals. Based upon all of these experiences and insight, I feel that my IES internship was a huge success!
APPENDIX A: MAPS OF CNC SITES
APPENDIX B: INTERNSHIP ANNOUNCEMENT

CINCINNATI NATURE CENTER
EDUCATION INTERNSHIP DUTIES AND OPPORTUNITIES
Revised 04/05

Cincinnati Nature Center offers a broad internship experience in the realm of environmental education/environmental interpretation for those wishing to enter the field or to “test the waters” to see if this profession might suit them. Interns become a valuable part of the education team and function as much like regular staff as they are capable of handling.

Expectations of interns are high but fair and the work environment is positive and encouraging. Interns are exposed to a broad variety of experiences, teaching opportunities and behind the scenes planning, some administrative meetings as well as a variety of outdoor activities. The internships are, in part, “get out of it what they put into it” experiences. We are always seeking self-motivated people.

Interns enhance their teaching skills and content knowledge as well as gain valuable experience in the education operations of one of the larger non-profit nature centers in the country. Program planning and curriculum development are major components of the internship. The internship is somewhat flexible, allowing interns some liberty to focus on specific areas of interest as time allows.

What follows is a listing of the possible array of duties one might encounter over the term of the internship:

SCHOOL GROUPS

-Teach or assist with a variety of lessons for schools. Lessons include:

-at Long Branch Farm and Trails
  -Life Needs on the Farm
  -Manure to Muscles
  -Better Breeds to Meet Our Needs (genetics and reproduction)
  -Global Classroom (deals with global issues such as resource use, population, wealth/poverty, human dependence on natural systems)
  -Early Ohio History (environmental history of the area around Long Branch Farm. Students travel back in time to meet a Shawnee, an early settler and a surveyor in the 1790's)–During fall internship only.
  -A variety of lessons specifically created for preschool students
A variety of lessons specifically created for preschool students

-Assist with the revision or development of lessons for school groups with duties including:
-Developing objectives
-Assuring lessons support appropriate Ohio proficiencies
-Developing the lesson content based on objectives/proficiencies using appropriate sources
-Training volunteers to teach the lesson to students
-Revising the lessons as needed

-Oversee the entire teaching day including:
-contacting schools and making final arrangements with teachers
-contact Long Branch teaching volunteers as needed
-set up all related lesson apparatus
-orient volunteers to any changes/new additions
-meet and greet the students and teachers
-complete accounting paperwork
-transport students from the bus to the education building via tractor and wagon
-present lesson introductions and conclusions in a large group setting (up to 50 students or more)
-teach lessons to groups of 8-10 students
-debrief the day with volunteers, recording any needs for adjustment and adjusting the lesson accordingly
-pick up related lesson apparatus

-Special Events
-assist with and help plan large public events such as:

-at Rowe Woods
  Preparing for Night   September 10, 2005

-at Long Branch Farm
Farm Babies  1st weekend in May, every year (cancelled for ‘05)
Harvest Days October 15 and 16, 2005 (pending)

-Notes: interns will be significantly more involved with large special event planning and execution when the event takes place at the site on which they are stationed. Otherwise, interns, like all educators, assist with the special events at the site at which they are not primarily stationed.

MEMBERS/PUBLIC PROGRAMS (SINGLE SESSION)

- Assist with development and implementation of new program medium using double rope technique for recreational tree climbing. This method is used to experientially teach local forest history, natural history, and any number of other topics in an active manner.

- Assist with the development of and lead a group for small public programs such as “Glow in the Dark Night Hike” (fall 04) at Long Branch Farm

- Assist with the planning, development and implementation of a family camp out complete with related night activities (spring 04 and fall 04) including leading an informal group on a trail and interpreting relevant natural history as well as other activities.

- Assist with planning and implementation of a “holiday camp” (post-Christmas, Presidents’ Day, Martin Luther King Day, etc.) for students. Days are much like mini-summer camp days.

OTHER INVOLVEMENT

- Fall interns will take part in “education orientation” for new teaching volunteers (held in late August each year).
- Interns will be formally evaluated on their group management skills and teaching techniques 1-2 times over the course of the internship. Informal evaluation and self-evaluation will be on-going.
- Interns will assist with planning and presentation of at least one volunteer educator workshop
- Interns may have the opportunity to attend conferences such as:
  - The Environmental Education Council of Ohio’s annual 101 Conference held at YMCA Camp Kern in early October of each year.
  - The National Association for Interpretation Region IV (Michigan, Ohio, Indiana and Ontario) Workshop held in the spring of each year
-Conference expenses are the responsibility of the intern. Ability to attend conferences is dependent on the needs for staff at the time of the conference.

Interns will receive on-going training in:
- interpretation techniques
- at the farm, interns will gain experience in livestock handling and especially training in using live animals as teaching tools (chickens, turkeys, sheep/lambs, goats, cattle, rabbits, pigs and honey bees)
- group management
- customer service
- natural history as required for lessons, more as time permits
- public safety at an interpretive site
- some minimal budget-related work as associated with program expenses/revenue
- some readings related to interpretation, environmental education, environmental ethics and/or natural history will be assigned periodically
- weekly volunteer educator workshops (interns will attend a number of these session with highly varied topics over the duration of their internships)

EXPECTATIONS FOR ENVIRONMENTAL EDUCATION INTERNS:

- Be on time (or better yet early) for all “on duty” days
- Be prepared to, on occasion, work late in order to finish a task. (There is no “overtime pay” but you will be compensated for your time at a later date)
- Be prepared for anything (both children and animals can be unpredictable)
- Give it your all (you get out of it what you put into it)
- Be self starting: Look around to see what needs to be done and do it
- Realize that “I don’t know” is an acceptable answer (thou shalt not make stuff up)
- Be prepared to be creative and passionate in all associations with the public, programming and with other staff

FUTURE EMPLOYMENT OPPORTUNITIES

Cincinnati Nature Center does, on occasion, have job openings (but these tend to be part-time educator positions). Bear in mind that the longer the employment experience, the more an intern can gain from the experience. The possibility of joining summer camp staff before (in the case of the fall internship) or after (in the case of the spring internship) the internship offers an extended learning experience as well as opportunity to experience more program development from conception to presentation to evaluation.
APPENDIX C: SAMPLE CINCYNATURE CAMP SCHEDULES

LBF CincyNature Camp
Farm Camp 5-9, 2005

TUESDAY
8:00-8:15 Morning Circle
8:15-9:00 Staff Chores - ALL
8:35 All Staff Head Down Hill to meet and greet campers and parents
  Sign in crew (2)- ____ & ____ Gate Keeper (1)- ____ Games (2)- ____ & ____
  Tractor Drivers (2)- ____ & ____ Up Front Speaker (1)- ____
  Group Breakdown (2)- ____ & ____
9:05 (ideally) Head up the hill and Lead Kids into Building
  Welcome (1) -
  Introduction of Theme for Week - SKIT (most)-
  Division into 5 Groups by age (2) -
9:15-9:30 Small Group Intro
  -Make Name Tags & Choose Vegetable/Animal/Naturey Name for Group
  -Small Group Introductory/Ice Breaker Name Game
  -How we act on the farm... Revisited (Leader goes First, Respect Everything/Everybody)
9:30-10:15 Chores
  5 Rabbits - Feed, Water, give 1-2 raisins each; Groom and pet; Digestion; let them out;
    *Feed young chicks
  1 Goats: feed honey suckle (staff cut, kids haul–stress safety) & groom (brushes in
    Showbarn tackroom); Digestion
    Why are we cutting honeysuckle anyway? + *Feed/Water garden chix +
    Garden work?
  2 Garden helping + deer scarecrow
  3 Chickens (Pens 2-4 in Coop), Feed (defined 5 scoops each side), Clean waterers, Handle,
    gather eggs & wash eggs (grade if time). Digestion; check mouse traps
  4 Visit Pigs (Feed them 5 full scoops) Observe, Pet if safe (back only), Squirt Gun them
    *Give Wether one cup (it’s in the bag of sweet feed)
    *Help in garden if you have extra time
10:15-10:40ish Active Game - BLOB TAG or staff choice
11:00-11:25ish Lunch then recycling games
11:30-11:49 Active Game – staff choice
  Book and Ice Cube
11:50-12:45ish Big Event
  5 Shakes and cow bone puzzle + hide pieces + cow products box
  1 Farm Scavenger Hunt
  2 Honeybees I or II (do I first)
  3 Corn: Products, kinds, grinding methods, grinding (cornbread OR corn chip making);
    weigh/package cornmeal – give extra to parents (with recipe); visit sweet corn/popcorn in
    the garden + fort building
  4 Insect Encounters: Net/catch insects; visit native bee boxes; look at insect products box
    *Read Hey Little Ant; Microscopy?
12:45-1:30 Big Event – PICK UP GEAR AFTERWARDS
X Popcorn/Book
1,2 Expedition: Stream; Could incorporate free choice – possibilities: puppets; kids act out
  narrated skit
3 Honeybees I or II (Do I first)
4  Chicks/eggs, incubator, candler, jarred embryos, egg turning, spend time with new chix
   *Pick garden weeds for chickens
5  Goat Visit + T-shirts: brush goats, see babies, Goat obstacle course + Chicken hang out
time

Group 1: Put rabbits back in
1:30-1:50  Game (large group game OK)
1:50      Sign Out Crew Heads Down the Hill
1:45 -1:55  The Talking Foot - "What was the best today?"
   Collect Name Tags, Hand out Schedules/Stuff for Kids to take Home
FOR 2:00  Kids and Staff Head Down Hill
2:10      Walk back up hill with any campers who haven’t been picked up yet
Until 3:00  Debriefing of Day
   Planning Tomorrow

Staff Chores - ALL
### LBF CincyNature Camp

**Summer Memories (Ages 6-12), 2005**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
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</thead>
<tbody>
<tr>
<td><strong>MONDAY</strong></td>
<td></td>
</tr>
<tr>
<td>8:00-8:15</td>
<td>Morning Circle</td>
</tr>
<tr>
<td>8:15-9:00</td>
<td><strong>Staff Prep – ALL</strong> Games: ____ &amp; ____ <strong>Relay:</strong> ____</td>
</tr>
<tr>
<td>8:40</td>
<td>Sign In Crew ____ &amp; ____ <strong>Gate:</strong> ____ <strong>Group Division:</strong> ____ &amp; ____</td>
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<tr>
<td>9:00-9:15</td>
<td>Introductory Skit</td>
</tr>
<tr>
<td>9:15-9:30</td>
<td>Introductory <strong>NAME</strong> Game - <strong>Staff choice</strong></td>
</tr>
<tr>
<td>9:30-10:30</td>
<td><strong>Chores</strong></td>
</tr>
<tr>
<td>10:30-11:30</td>
<td><strong>AM Big Events</strong></td>
</tr>
<tr>
<td>11:30-12:00</td>
<td><strong>Lunch/Recycling Games</strong></td>
</tr>
<tr>
<td>12:00-12:20</td>
<td>**Active Game - <strong>Staff Choice</strong></td>
</tr>
<tr>
<td></td>
<td>OR Book and Ice Cube (restock cubes)</td>
</tr>
<tr>
<td>12:20-1:30</td>
<td><strong>Fish/Crayfish Get Bait</strong></td>
</tr>
<tr>
<td>1:30-2:00</td>
<td><strong>Filler Option:</strong> Microscopy, deer scare crow</td>
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</table>

**Chores**
1. Rabbits - Feed, Water, Add a handful of hay; Groom and pet; Digestion; Option: LET THEM OUT
2. Garden work and eat
3. Goats: Feed honeysuckle (staff cut, kids haul – stress safety) & Groom; digestion
   *Why are we cutting honeysuckle anyway? Garden work as needed*
4. Chickens (Coop), Feed (defined 5 scoops each side), Clean waterers, Handle, gather eggs & wash eggs (grade if time). Digestion; check mouse traps?
5. Visit Pigs (Feed them 5 full scoops) Observe, Pet if safe (back only), Squirt Gun them
   *garden work as needed*

**AM Big Events**
1. Corn: Products, kinds, grinding methods, grinding (cornbread making); weigh/package cornmeal – give extra to parents (with recipe); visit sweet corn/popcorn in garden + MAKE CORNBREAD FOR THE AFTERNOON + Fort building?
2. Insect Encounters: Net/catch insects (save bees for Jason), visit native bee boxes
   *Read Hey Little Ant, Microscopy*
3. Fort Building
4. Baby Chicks, hatching, incubator check temp/refill water, eggs from coop, candle
5. Camouflage, unseen animals, hiding, find Jason, hide from another group, basics of animal camo (stay still, blending patterns, location)

**Lunch/Recycling Games**

**Active Game - **Staff Choice**

**Fish/Crayfish Get Bait**

**PM Big Events**
1. Fish (prints to show anatomy/kinds of fish, nets, traps)
2. Pawpaw grove hike and watering, find beads, mark trees with fruits, what else in stream?, skulls/pelts
3. Canoeing/Beaver lodge (beaver tub)
4. Stream: Crayfish: game outfit, search, crayfish sexing, traps
5. Creek Romp; Kingfisher; pick up trash (buckets), clay if loose, mussels, whatever you find

**Filler Option:** Microscopy, deer scare crow
1. Farmyard Croquet
2. Long Branch Band: bass tub, instruments, hats?
3. Poly-clay bead creation; mancala
4 Puppet show with sound effects? Present to other group?
5 T-shirt time

2:00-2:45 Afternoon buffer possibilities: Fort building, garden exploration, waterfall walk (after rain), visit chicks, ground hog search/feeding, salamander survey, Bingo Dotters/banner

GROUP 3 CLOSES CREEKSIDEBARN AND EDU. SHED BEFORE DEPARTING FROM CREEKSIDEBAR
2:45-3:15 Make a snack (highlight product origins)
   1 Cornbread/corn crackers with maple syrup (cornhole, squeeze bottle for syrup, muffin tin, use egg, visit chicken coop, garden) OR corn chips
   2 Soft Pretzels (Farmyard – kitchen); Grind wheat
   3 Soynuts: tinker with soy stems, soybean shooting
   4 Sugar Quest in Garden; Photosynthesis cell
   5 Popcorn & Running story (Creekside barn)

Afternoon Chores: put chickens back, cleaning
- Put rabbits back in
- Set mouse traps
- Sweep entrances
- Sweep around your station
- Bee stuff

3:15-3:45 Games
3:50 Kids in parking lot
4:05 Debriefing of Day/Planning Tomorrow
First Farm Discoveries
July 5-8, 2005

TUESDAY – SHEEP

8-8:15  Morning Circle
8:15-8:50  Prep
8:50-9:00  Campers Arrive/Sign In (Nametags)
  - 2 sign-in staff
  - Remainder of staff man centers
  **REMIND PARENTS PICK-UP WILL BE IN GAYNOR PARKING LOT
  **HAND OUT PARENT LETTER

9:00-9:30  Center Time
  - Discovery Table with corn
  - Shearing Sheep
  - Giant stuffed sheep with halter on, hay to feed
  - Easel – wool paint brushes
  - Card wool
  - Spin carded wool to make bracelets
  - Roleplay knitting with chopsticks
  - Feltboard – wool felt pieces
  - Books and puzzles (wool puzzles)
  - Camp T-shirt
  - Playdoh

9:30-9:45  CIRCLE TIME – Hello song and puppet show
  Song: Baa Baa Black Sheep; play on guitar

9:45-10:35  Divide into 3 groups
  Rotate through stations

  1  GAMES (10 min)
    Warm Up the Sniffers
    Discuss how lambs find their mommy by how they smell.  Play a
    smelling game.  Put different scents (peanut butter, banana, and
    onion) into film canisters covered with wax paper with holes
    punched in.  Pass each around and see if children can identify the
    smell.

    Smelly Ewe

    Follow the Shepherd – Play follow the leader by following the
    person with the crook.

  2  SNACK AND STORY (15 min)
  3  VISIT SHEEP AND GOATS (25 min)

10:35-10:45  Wrap-up and goodbye
10:45-11:00  Wagon Ride down hill
11:00  Sign out
Debrief and Clean-up
APPENDIX D: CNC SCHOOL PROGRAMS BROCHURE

CINCINNATI NATURE CENTER
Reconnecting people with nature for 40 years!

Offering programs for grades pre K-12!

School Programs 2005-2006
Addressing Science and Social Studies standards through hands-on outdoor experiences.
About CNC School Programs

Make Learning Come Alive!

Plan a school trip to one of Cincinnati Nature Center’s sites. Our school programs are designed to enhance and integrate your school’s curriculum by providing hands-on, outdoor experiences. All lessons address state standards. Classes are divided into groups of approximately eight students per instructor for a high quality experience on the trails. CNC’s group leaders are highly trained and experienced.

Two Sites, Endless Options

Rowe Woods (RW) Serving grades preK-8 — This site consists of 1,025 acres of diverse habitats of forest, fields, ponds and stream and offers 17 miles of hiking trails. In this wild outdoor laboratory, students experience nature and develop an understanding of their place in the web of life. Lesson plans address a wide range of natural history and ecological topics for grades preK-8. Each season offers varied learning experiences such as animal tracking or studying pond life. Group size is limited to 65 students per day. School groups are accepted Tuesday through Friday.

Long Branch Farm & Trails (LBFT) Serving grades preK-K — This 582-acre working farm emphasizes ecology in both natural and agricultural environments. On the farm, students will interact with farm animals, including cattle, sheep, pigs, chickens and goats. They will come to know how farms help humans meet their needs and will experience the interconnectedness of life through hands-on learning — how plants, animals and people depend on one another for survival. Long Branch Farm & Trails serves preK with one-day field trips. Programs for grades 1-12 are available only through multi-visit partnerships and registrations for partnership opportunities for 2005-2006 are full.
SCHEDULING A VISIT

How to Schedule a Visit
1. Complete the enclosed School Programs Application, choosing the site you wish to visit and your preferred visit dates.
2. Submit 10 preferred visit dates in priority order and apply early. Applications are processed on a first-come, first-served basis, so early applications are more likely to receive preferred dates.
3. Mail the application to the address on the form or fax it to (513) 831-8052.
4. A school group information packet will arrive after we process your application. You must complete and return the School Visit Confirmation Form to confirm your scheduled trip. If you wish to have the information packet mailed to your home address, please include that address and phone number on the application.
5. Please contact the Program Coordinator at (513) 965-4894 or schools@cincynature.org if you have any questions.

Fees and Payment Information
Cost is $4 per student. One adult chaperone and/or teacher is admitted free of charge for every eight students. Each additional adult is $4. Fees are due on the day of your visit. If your school requires billing, we must have a purchase order.

Cancellation Policy
A cancellation fee of $25 per scheduled date will be charged for schools canceling less than 45 days before the scheduled visit.

Teacher Orientation
Educators are encouraged to call for a free tour of Rowe Woods or Long Branch Farm & Trails prior to their class visit. If you are new to our program, this tour will familiarize you with the site and help you establish expectations for your field trip, creating a smooth transition for your students. Tours can be customized to fit your schedule. Call (513) 831-1711 to schedule your tour.
<table>
<thead>
<tr>
<th>Program Description</th>
<th>Grades</th>
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<tbody>
<tr>
<td><strong>SCHOOL PROGRAMS AT ROWE WOODS</strong></td>
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<tr>
<td>Group size is limited to 40 students</td>
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<tr>
<td><strong>Program Description</strong></td>
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<tr>
<td><strong>Forest Ecology</strong></td>
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<td>Ideal for grade 4</td>
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<tr>
<td>Students will examine a forest habitat</td>
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<td>to see examples of succession and</td>
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<td>stratification while working on plant</td>
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<td>classification and tree keying skills.</td>
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<td>Plant life cycles will be examined</td>
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<td>using wildflowers in spring and seed</td>
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<td>dispersal in fall. The value of plants,</td>
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<td>particularly trees, will be examined in</td>
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<td>all stages from seed to decomposed log.</td>
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<td><strong>Insects</strong></td>
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<td>Students will search for insects in a</td>
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<td>variety of aquatic and terrestrial</td>
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<td>habitats, looking for similarities and</td>
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<td>differences, various life stages, and</td>
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<td>adaptations that make each insect</td>
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<td>unique. Insects will be released back</td>
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<td>into their habitats at the end of the</td>
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<td>day.</td>
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<td><strong>Ohio Plants and Animals</strong></td>
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<td>Students will observe real-life examples</td>
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<td>of local plants and animals in various</td>
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<td>life stages. They’ll explore the pond,</td>
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<td>field and forest while learning about</td>
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<td>the physical and behavioral adaptations</td>
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<td>of the plants and animals living in</td>
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<td>each habitat.</td>
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<td>K-2 LS Benchmark B, Grade 2 Indicators</td>
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<td><strong>Pond/Stream Study</strong></td>
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<td>on exploration of ponds and/or streams.</td>
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<td>Students will study diversity,</td>
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<td>adaptation and interrelationships among</td>
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<td>the organisms they find.</td>
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<td><strong>Rocks, Fossils and Landforms</strong></td>
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<td>Students will identify examples of</td>
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<td>discover and identify Ordovician fossils</td>
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<td><strong>What’s for Lunch</strong></td>
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<td>Students will search for living</td>
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<td>of food chains, population</td>
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<td>Examples of skulls, teeth and living</td>
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Early Childhood School Programs at Rowe Woods

Preschool and Kindergarten Field Trips are available at Rowe Woods Tuesday-Friday from September-November and March-May.

Nature in Spring
Spring has sprung! With an easy hike, songs, stories and games, your class will discover signs of spring. Frogs are hopping and flowers are blooming as nature awakens from its long winter slumber. This field trip includes an introductory puppet show and discovery time with hands-on, age-appropriate learning centers. These unique centers allow children time to further their spring exploration through active, child-centered learning.

Nature in Fall
The air is crisp and the squirrels are busy! Your class will shuffle down the trail through fallen leaves to see what the animals at Rowe Woods do in fall. We will explore the brilliantly colored leaves and discover other signs of fall through songs, games and active, hands-on exploration. This field trip includes an introductory puppet show and discovery time with hands-on, age-appropriate learning centers. These unique centers allow children time to further their fall exploration through active, child-centered learning.

Once Upon a Cabin
How did pioneers live in simple cabins? Visit Abner Hollow Cabin and see for yourself! Through role playing, games and stories, your class will discover first-hand how pioneers collected food and prepared meals, made clothing and entertained themselves. Take your class on a trip back in time. This lesson is ideal for kindergarten.

Early childhood field trips cost $4 per student. Group size is limited to 24 students. Two adults (teachers and/or chaperones) are admitted free of charge per each group of six students. Additional adults are admitted for a fee of $4 each. Recommended field trip length is two hours.

For more information or to request an Early Childhood School Programs brochure, call (513) 831-1711.
Early Childhood School Programs at Long Branch Farm & Trails

Preschool and Kindergarten Field Trips are available at Long Branch Farm & Trails Tuesday-Friday from September-November and March-May.

The Farm in Spring
Meet baby farm animals and plant seeds to take home as we discover what happens on a farm in spring. This field trip includes an introductory puppet show and discovery time with hands-on, age appropriate learning centers. These unique centers allow children time to further their spring exploration through active, child-centered learning.

The Farm in Fall
Come help the animals stay warm all winter! Your class will visit the barnyard to meet the farm animals and help them prepare for the cold winter months. Then take a trip to the garden to learn about fall harvest plants through a story, songs, and exploration. This field trip includes an introductory puppet show and a dramatic ending.

First Farm Discoveries
Your youngest students will put all of their senses to use making barnyard discoveries on this guided tour of the farm. This field trip includes an introductory puppet show and hands-on exploration.

Early childhood field trips cost $4 per student. Group size is limited to 24 students. Two adults (teachers and/or chaperones) are admitted free of charge per each group of six students. Additional adults are admitted for a fee of $4 each. Recommended field trip length is two hours.

Early Childhood Education Outreach Programs
Group size is limited to 24 students.

Outreach programs are available Tuesday-Friday in December, January and February.

Which Came First, the Chicken or the Egg?
Your class will sing songs, play games and visit with a live hen as we explore chickens and their eggs.

Winter Birds
Through songs, games and stories your class will learn to identify feathered friends that love to visit bird feeders. We’ll show you simple bird feeders that you can make with your class.

Out on a Limb
What tree-mendous fun! Through role playing songs and games your class will discover a tree’s parts, how they are used and learn who calls the tree home.

Early childhood outreach programs cost $75 plus mileage for the first session, $50 for each additional session on same day. Outreach programs are 30-45 minutes long.
APPENDIX E: CNC EDUCATOR OBSERVATION SHEET

What to Observe as an Observer

The Beginning

Getting Acquainted: How do the leader and children get acquainted?

How does the leader introduce the lesson to the children?

How does the leader take into account learner level/age appropriateness? (adjust)

How does the leader engage the students in the first teaching situation?

What does the instructor do to focus the students’ attention?

How does the instructor develop a relationship with the students?

Subject Matter

In what circumstances are the children most engaged?

Least engaged?

How are the irrelevant experiences (such as teachable moments) woven into the day’s theme?

What effect did their level of engagement have on their behavior?

Techniques

How does the leader guide the children’s thinking through questioning?

What types of questions does she/he use?

How does the leader vary the learning opportunities?

Process of Learning – The Inquiry Approach

In what ways are the children able to “discover” the lesson at any particular station on their own?
Group Management

Are the children comfortable in their environment? Why or why not?

What effect does this have?

Are all the students included? (Can they all see? Are they all able to participate?)

How does the instructor deal with discipline challenges?

Is it proactive or reactive?

The Aftermath

What interactions have been taking place between the leader and the children?

Between children and leader? Between children?

How did the adult chaperone fit into the group?

When do the children appear to reach the objective understanding of the lessons?

What did you observe today that you could add to your teaching toolbox?
APPENDIX F: SCOUT BADGE REQUIREMENTS

Brownie Girl Scouts Eco-Explorer Try-It
(from Girl Scouts of the USA 2000)

1. Exploring Nature: Try to find both living and nonliving things in the natural environment. You’ll need a pencil. When you find an item, check it off.

Do your best not to harm, move, or take away any of these things. Animals and plants may depend on them.

Nonliving things

___ dew drops
___ smooth rock
___ shiny rock
___ sand
___ broken rock
___ water
___ sunlight
___ clouds
___ rock piles/cliff

Living things

___ flat green leaf
___ green leaf with pointy edges
___ green leaf with insect holes
___ green pine needles on a tree
___ insects (ant, caterpillar, beetle, butterfly, or any other)
___ flower
___ cactus
___ mushroom
___ moss
___ squirrel
___ chipmunk
___ bird
___ worm

*Signs of living things*

___ ant hill
___ bird nest
___ bones
___ broken twigs/branches
___ brown leaves lying on the ground
___ bits of fur/feathers
___ spider web
___ animal footprint

2. What’s a Habitat?: Unscramble the words below. The clue underneath the blanks will help you. Then you will discover the four most important things that an animal (or plant) needs in order to survive.

1. ___ ___ ___ ___
ofod
   Clue: When you are hungry and your stomach is growling, you need to find some of this.
2. __ __ __ __
tawre
Clue: When you are thirsty, this is the best liquid for you to drink, and it’s not soda!

3. __ __ __ __
pasec
Clue: This one word means a place to live and it rhymes with place.

4. __ __ __ __ __
telhser
Clue: If you were outside and there was a bad storm, you would look for this type of place.

Now you know what is found in a habitat. A habitat is the place where an animal (or plant) lives and finds the four things above that it needs to survive. It is like the animal’s (or plant’s) address.

3. Make a Habitat: Pick one of the animals from the following list (or any other one you like) and make a pretend habitat for it to live in. Don’t forget to include food, water, and shelter for your animal!

- squirrel
- lion
- shark
- bear
- hawk
- monkey

Make a habitat in a shoebox with buttons, clay, colored construction paper, cotton balls, felt, tissue paper, pipe cleaners, and other materials.

4. Food Chain: Plants make food for all living things and use the sun’s energy to grow. When animals eat plants, they get energy. You also get energy from eating food. Your food may be plants or animals.

A food chain shows how energy is passed from one living thing to another. All food chains start with plants. You can make your own food chain. You will need:

- 8 ½” by 11” sheets of paper
- Crayons or markers
- Pencils
- Tape
- Pictures of plants and animals
1. Cut a few pieces of paper in half the long way.

2. Find a picture of a plant or draw one. Tape it to one of these strips of paper.

3. Loop the ends of the strip of paper together and add tape to make a closed circle. You now have the first link in your food chain.

4. Find or draw a picture of something that can eat your plant. Tape it to another strip of paper. Put one end of the strip through the first link and tape the ends to make another closed circle. Now your food chain has two links.

5. Find or draw a picture of something that eats the animal that is eating your plant. Make a third loop. Follow the direction in Step 4.


Here are some food chain ideas for you to start with:

- grass – prairie dog – rattlesnake
- acorn – gray squirrel – red-tailed hawk
- flower – beetle – skunk – great horned owl
- mayfly – sunfish – wood stork - alligator

5. **Speak up for animals!** Some animals that live on the earth are endangered. If we do not protect them, they will be gone forever.

Put together a show that will tell people more about endangered species.

1. Pick an animal from the list below or find another animal that lives near you that is endangered.

   - Peregrine falcon
   - Black rhinoceros
   - Florida panther
   - Mountain gorilla
   - Galapagos tortoise
   - Karner blue butterfly
   - Black-footed ferret
   - Giant panda
   - Orangutan

2. Look up why your animal is endangered. You can go to the library and ask an adult to help you search the Internet for information.
3. Write about why you feel it is important to save your animal, where your animal lives, and why it is endangered. What can people do to help?

4. You may want to choose some music for the opening and closing of your talk show. You can include animal sounds.

5. After you’ve put on your show once, you might like to invite your parents or another troop to come and see it!

6. **Helping Wildlife:** As a Girl Scout, you care about the earth. When you recite the Girl Scout Law, you promise to “use resources wisely”. Pick at least one of the activities from the list that follows to help wild animals. Work with your leader or another adult.

You can:

- Put up bird nest boxes. You can find directions on how to make them in many bird books. You can even make them from old milk cartons. Or put out birdbaths. You can use big plastic saucers like the ones found under plant pots.

- Make brush piles by piling up lots of dead branches and leaves. Small animals, like snakes, toads, chipmunks, and turtles, often hide under them.

- Snip six-pack rings with a pair of scissors. You know, those plastic rings that are used to hold together six-packs of soda. Why? Because the rings can cause harm. Animals can get their necks or beaks caught in them. In many cases the animals can’t eat, so they die.

- Plant a garden for butterflies. Butterflies are only attracted to certain flowers. Also, some flowers may not grow in your area. Check at the plant store to see which ones will be best for this project.

- Put out a bird feeder and keep it filled all winter.
Junior Girls Scouts Wildlife Badge
(From Girl Scouts of the USA 1990)

COMPLETE FIVE ACTIVITIES, INCLUDING THE TWO STARRED

1. Find out which bird, tree, and flower have been chosen to represent your state. See if your state has any other wildlife symbols, such as state insect or a state fish. Discover why each was chosen.

2. Learn to identify the poisonous plants in your locality and where each is most likely to be found. Know what to do if a poisonous plant is touched or eaten. Learn about poisonous animals and insects in your area, and what to do if you see a poisonous or sick animal.

3. Visit a wildlife refuge, a nature center, a Girl Scout Lou Henry Hoover Memorial Sanctuary, or a wildlife management area. Investigate how the area is providing habitat for wildlife. Find out if there are ways the area is being managed for wildlife and why.

*4. Find out if there are any endangered plants and animals in your state. Find out why they are endangered and what is being done to protect them. Learn about an organization that works to protect endangered species in your area, the United States, or the world. Participate in a project that improves or establishes wildlife habitat in your community, state, or another country.

*5. Focus on at least one of the following wildlife groups and complete the activities for that group as outlined below
   - Amphibians
   - Birds
   - Fish
   - Insects
   - Mammals
   - Reptiles

   Learn to identify at least five species of this particular wildlife group by a combination of how they act (behavior), how they sound, how they look (field marks), or where they live (habitat).

   Describe the characteristics that are shared by species of this wildlife group. For example, how do they give birth to their young; are they warm- or cold-blooded?

6. Visit a park, zoo, stream, aquarium, wildlife preserve, or perhaps your own backyard, where you can observe a species from your wildlife group. Observe how it interacts with its environment and with other creatures. Does it have any special adaptations, such as teeth or color, to do this? How does it eat, move, and relate to others of its own species?

   Learn which species in this group are protected by law.
7. Find out about careers related to wildlife by talking with someone who is in wildlife management, works for a zoological society, or is a wildlife biologist.
Webelos Cub Scouts Naturalist Badge  
(From Boy Scouts of America 1998)

Do Four of These:

1. Keep an “insect zoo” that you have collected. You might have crickets, ants, or grasshoppers. Study them for a while and then release them.

2. Set up an aquarium or terrarium. Keep it for at least a month.

3. Visit a museum of natural history, nature center, or zoo with your family, den, or pack. Tell what you saw.

4. Watch for birds in your yard, neighborhood, or town for one week. Identify the birds you see and write down where and when you saw them.

5. Learn about the bird flyways closest to your home. Find out which birds use these flyways.

6. Learn to identify poisonous plants and venomous reptiles found in your area.

7. Watch six wild animals (snakes, turtles, fish, birds, or mammals) in the wild. Describe the kind of place (forest, marsh, yard, or park) where you saw them. Tell what they were doing.

8. Give examples of:
   - A producer, a consumer, and a decomposer in the food chain of an ecosystem
   - How humans have changed the balance of nature
   - How you can help protect the balance of nature
APPENDIX G: “COSTUMES OF NATURE” PRESENTATION
(Black and white version; read left to right then down)

Costumes of Nature
Valerie Horobik and Heather Hahn
CNC Volunteer Workshop
November 7, 2005

What is a costume?

Costumes exist in nature too!!!

Camouflage
An adaptation that allows an organism to blend in with its surroundings to avoid drawing attention to itself

Simple Camouflage
Coloring or shape that blends in with the animal's most common surroundings
Usually resembles vegetation

Skipper Butterfly

Dreamy Dusky Wing

Hairstreak Butterfly
Mourning Cloak

Karner Blue Butterfly

Butterfly Pupae
Hackberry Butterfly Satin Azure Butterfly

Mantids

Snowshoe Hare Polar Bear
Disruptive Coloration
Breaks up the solid outline of the animal's body, so it is harder to recognize.
Counter Shading
Animal is shaded light to dark, providing two types of camouflage, depending on your point of view.

Penguins

Shark

Gray Squirrel

Behavioral Camouflage
Through their actions, as well their coloring, an animal blends in with its surroundings.

Alligators

American Bittern

Mimicry
An adaptation in which an organism imitates something other than what it is in pattern, color, form, or behavior

- Usually another organism
- Can be used by prey to trick predators into believing one is inedible or a dangerous organism
- Can be used by predators to trick prey into believing they are not a threat
Batesian Mimicry
- Discovered in 1862 by Henry Bates
- Harmless organism mimics a harmful or distasteful model
- Often involves aposematic coloring

Coral Snake mimicry

Coral Snake mimicry
Scarlet King Snake
Milk Snake

Bee and Wasp mimicry

Pipevine Swallowtail mimicry
Pipevine Swallowtail
Eastern Tiger Swallowtails

Criteria for success
- Model must be recognizable by predators as distasteful or harmful
- Mimic numbers must be low relative to model numbers
- Mimic must look similar enough to the model to be confused with it

Mullerian Mimicry
- Discovered in 1878 by Fritz Muller
- Multiple species that are all distasteful or dangerous resemble one another
Why bother?
- Predator associates negative quality with a prey's appearance
- Mimics look similar enough to the organism first experienced that they cannot be easily differentiated by the predator
- They are avoided without direct contact (predation)
- Per capita loss per species is decreased

Self Mimicry
One body part mimics another to confuse predators, increasing chance of survival in an attack

Monarch and Viceroy Butterflies

Poison Arrow Frogs

Poison Arrow Frogs

Wasp and Bee species

Tiger Swallowtail Caterpillar

Spicebush Swallowtail Caterpillar
Hawk Moth Caterpillars

Io Moth

Orange Ringlet Butterfly

Self Mimicry: An adaptation in action

Pipe Snake

Self Mimicry: An adaptation in action

Hairstreak Butterflies

Leafhopper Extraordinaire!
Hognose Snake

Test Time: Which way do I go?

Transformational Mimicry
- Resemble an object in order to avoid predation
- Not simply blending in with background vegetation

Giant Swallowtail Caterpillar
Indian Leaf Butterfly
Treehoppers

Twig Caterpillars
Wasmannian Mimicry
Mimic resembles model in order to live among models, acquiring protection

Ant Mimics
Aggressive Mimicry
Predator mimics another organism in order to get closer to its prey

Alligator Snapping Turtle and Giant Frogfish
Zone-tailed Hawk
Female *Photuris* Fireflies

Chemical Mimicry

An organism produces a specific compound or mixture of compounds to illicit certain behavioral responses by other organisms

Pollinator Attraction

Bolas Spider

Native Examples

Whitetail Deer

Disruptive Coloring, Camouflage, Counter Shading

Brown Creeper

Camouflage, Counter Shading

Walking Stick

Transformational Mimicry
Transitional Mimicry: Katydid, Geometrid Caterpillar, Noctuid Moth, Tawny Emperor Butterfly, Polyphemus Moth, Black Rat Snake

Camouflage: Gray Treefrog, Gray Fox

Self Mimicry: Polyphemus Moth
Yellow Crab Spider
Aggressive Mimicry, Camouflage

Ambush Bug
Camouflage

Lacewing Larvae with Aphids
Aggressive Mimicry

Anguina Moth Caterpillar
Transformational Mimicry

Box Turtle
Camouflage

Killdeer Nest
Camouflage / Transformational Mimicry

Woodcock
Camouflage

Towhee
Counter Shading, Camouflage
Sources Consulted


Sources Consulted

APPENDIX H: DISCOVERY CORNER PHOTOS

Before photos (after some clean-up and organization)
After pictures (area nearing completion)
# APPENDIX I: STATISTICAL PROJECT OUTPUTS

Table 1. Summer Memories Camp Age Distribution, 2005

<table>
<thead>
<tr>
<th></th>
<th>WK 1</th>
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<th>WK 3</th>
<th>WK 4</th>
<th>ALL SUMMER MEMORIES</th>
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Table 2. Farm Camp Age Distribution, 2005.

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Table 4. Rowe Woods Camp Age Distribution, 2005

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Volunteer Workshop Attendance 2000-2005

Seasonal Average Workshop Attendance
Yearly Average Workshop Attendance

![Graph showing yearly average workshop attendance from 2000 to 2005. The attendance decreases each year with a trend line. The y-axis represents attendance ranging from 0 to 40, and the x-axis represents the years 2000 to 2005.]
REFERENCES


