From June through December 2003, I served an internship at the Cincinnati Nature Center (CNC), located in Cincinnati, Ohio. The CNC formerly had three sites but one of them (Gorman Heritage Farm) was sold to the city of Evendale, (near Cincinnati) in November 2003. The two sites currently owned by the CNC are Rowe Woods (790 acres) and Long Branch Farm and Trails (581 acres), located in Milford and Goshen, respectively. The mission of the CNC is to inspire passion for nature and encourage responsible choices through experience and education. The purpose of my internship was to increase my knowledge of natural history, and to improve my skills in sharing this knowledge with others. To accomplish this, I prepared plans on various natural history topics, taught school and non-school groups, led hikes and farm tours, researched interpretive trail topics and made public presentations. In addition, I helped care for the CNC farm animals.
AN INTERNSHIP IN ENVIRONMENTAL EDUCATION AT THE
CINCINNATI NATURE CENTER

An Internship Report

Submitted to the
Faculty of Miami University
in partial fulfillment of
the requirements for the degree of
Master of Environmental Science
Institute of Environmental Sciences

by
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CHAPTER 1

Introduction

Overview of Internship Requirement

The Institute of Environmental Sciences (IES) of Miami University has as part of its Master’s degree program, a research requirement which is fulfilled after completing the core classes and a comprehensive examination. To fulfill the research requirement, a student can choose the internship, practicum, or thesis option based on what the student feels would be most advantageous. The internship is the most commonly chosen option; it requires at least a six-month period of employment in the student’s area of concentration. During this period, the student is expected to participate in various projects at the internship site, write monthly reports on his or her work, and submit those reports to IES and all members of his/her committee. At the end of the internship, a final report is written and presented to fellow students, peers, professors, and the committee.

Of the three research options, I chose to do an internship because I felt the internship would provide me with the best experience in my area of concentration – environmental education and interpretation. In addition, as an international student at Miami University, I felt that an internship option
would provide me with some work experience in the U.S.A. that might be useful in the future when I am searching for a full-time job. By interning at the CNC, I gained valuable hands-on experience because this organization has many diverse programs. The most exciting program I enjoyed was “Global Classroom” which involves learning about different cultures of the world, sustainable development, and conservation of natural resources.

The CNC has a permanent staff of 15, four interns, and a pool of dedicated volunteers. I interacted with the entire staff, but I reported every morning to Jason Neumann, Assistant Education Director and Internship Coordinator. My internship ran from June 15 to December 19, 2003, and included time spent at both CNC sites. I was privileged to explore the beautiful natural habitats at Rowe Woods, and I gained equally valuable experience taking care of the farm animals at Long Branch Farm & Trails. Throughout my internship, I participated in many activities at the CNC, such as teaching, programs planning, designing interpretive trails, caring for animals, managing gardens, performing puppet shows, caring for honey bees, providing wagon rides to school groups, conducting research, and giving public presentations. Equally important was that I gained experience in interacting with coworkers in a respectful and friendly manner. Through all these activities, I was able to help the CNC fulfill its mission of educating
the public about nature while increasing my knowledge in the field of environmental education and interpretation.

**Overview of the Cincinnati Nature Center**

In 1965, a group of dedicated and visionary naturalists, including Kay Benedict, Helen Black, Karl H. Malowski, Katherine T. Nyce, and Stanley M. Rowe Sr. created an organization dedicated to enabling people to experience, study, and enjoy the natural world. Cincinnati Nature Center’s (CNC) original site, Rowe Woods in Milford, Ohio, was the physical location of this new organization. Donated to the CNC by the Stanley M. Rowe, Sr. family, Rowe Woods consists of 790 acres of fields, forests, ponds, and streams.

In 1972, Neil and Camilla McElroy made a generous donation to the CNC. Interested in preserving their land for future generations, the McElroys donated their Long Branch Farm in Goshen, Ohio to the CNC. Encompassing 581 acres of agricultural and natural land, the site is an invaluable teaching tool. Visitors to Long Branch Farm learn about its prize winning livestock, sustainable gardening, and rare exposed layers of Ordovician fossils (http://www.cincynature.org.). Within its scenic pastures, meadows, woodlands, and crop fields, the practice of sustainable agriculture
is nurtured and the heritage of this vulnerable land is preserved. Hiking trails wind through this unspoiled and peaceful area.

Another gift of land was given to the CNC in 1995 by siblings Jim and Dorothy Gorman. Known as the Gorman Heritage Farm, the 100-acre family farm in Evendale, Ohio, was opened to the public in 1996. Due to budget constraints, the farm was closed to the public in August 2003, and in November 2003, the farm was sold to the city of Evendale.

Today, the CNC’s two sites (Rowe Woods and Long Branch Farm & Trails) comprise over 1,500 acres of irreplaceable natural and agricultural land, making it one of the most important nature centers of the United States of America (USA). The education programs offered by the CNC reach about 12,000 school children each year, emphasizing hands-on lessons about ecology, and helping to ensure responsible stewardship of the land.

The CNC has many volunteer opportunities. There are opportunities for educators, gardeners, grounds workers, gift shop salespeople, office assistants, trail, and farmyard ambassadors, and special events crew. Below is a brief description of the volunteer opportunities at the CNC. These opportunities are grouped into three categories: educators, outdoor workers, and others.
Volunteer educators:

- School group educators- Teach school children to explore nature by using hand-on activities. Help them understand the ecology of our natural and agricultural lands, and to appreciate ecological relationships, including the connection between humans and the environment. Weekly training classes are offered September through May.

- Weekend groups- Lead scout groups and youth groups on discovery hikes to explore the natural world. Training opportunities and workshops are offered on a regular basis.

- Adult group guides- Guide and host adult groups, senior citizens, garden clubs, and other organizations. Introduce them to the trails, buildings, and programs of the CNC. This requires knowledge and experience in at least one area, such as wildflowers, birds or CNC history.

- Bird walk leaders- Lead bird walks through forest and field at either Rowe Woods or Long Branch Farm & Trails on Saturday mornings. This requires knowledge of the birds of Ohio.

- CincyNature Camp- Assist staff environmental educators with children’s summer camp at at both sites of the CNC.
• Summer program in nature (SPIN) - Lead groups of children from other summer camps and day care centers for general nature hikes at Rowe Woods. SPIN runs Tuesday and Wednesday mornings in June and July.

**Volunteering for outdoor work:**

• Gardening- Assist with planting, weeding, and general maintenance of CNC gardens, namely, the education garden at Long Branch Farm and the herb wall at Rowe Woods.

• Grounds Work- Help maintain CNC grounds and trails. This may include removal of invasive nonnative plants, trimming brush, repairing fences, laying gravel or wood chips, painting buildings, or any number of other tasks.

• Farmland- Help with general farmyard chores such as feeding livestock, or harvesting hay at Long Branch Farm. Volunteers for these activities must be comfortable with farm animals and be able to do physical work.

• Friends of the farm- Work with farm animals at Long Branch Farm. Help with grooming, routine animal health care, and taming animals for children’s programs.
• Trail ambassador- Walk the trails and act as an ambassador of the CNC by monitoring trail conditions, helping visitors find their way, responding to rule violations, reporting incidents, and ensuring safety of visitors, property, and animals.

Other Volunteer opportunities:

• Office- Help with mailings, telephoning, data entry, record keeping, stuffing envelopes, and other office duties.

• Gift shop- Answer phones, greet visitors, provide general information, and take program registrations. Help the shop manager unpack and display merchandise, take inventories, and price items.

• Library- Help type catalog cards and organize, monitor, and inventory library books at Rowe Woods.

• Special events- Help set-up events, greet visitors, direct traffic, serve refreshments, lead tours, assist with crafts or clean-up at the end of events.

• Special projects- These include projects that require special skills such as sewing, carpentry, photography, equipment repair, or farm implement restoration.

The CNC has different kinds of membership and membership benefits.

Individual membership provides admission for an adult at the cost of $35 per
year, student membership is $15, and family membership is $60 per year. Family membership provides admission for one or two designated adults and any children under 21 from same household. Grandchildren are included when accompanied by grandparents holding a family membership. Basic membership benefits are:

- Free admission for one year to all the CNC sites.
- Free parking at all CNC sites.
- Four guest passes (each admits two people).
- A subscription to Newsleaf, CNC’s quarterly member publication.
- A ten percent discount at CNC gift shops and produce stands.
- Discounted fees, waived fees, and/or early registration for selected programs and events.
- Special invitation to members-only events.
ROWE WOODS

Background

Rowe Woods is the original site where CNC was founded in 1965 by Stanley Rowe Jr. Mr. Rowe was assisted by other naturalists including Kay Benedict, Helen Black, Karl Malowski and Katherine Nyce. The site is located in Milford, Ohio and consists of 790 acres of fields, forests, ponds and streams. It has 14 miles of hiking trials for visitors to explore and enjoy. Educational programs for people of all ages take place in this outdoor classroom, teaching the interdependence and diversity of the natural environment. Visitors can spend an hour or a day during all four seasons exploring what Rowe Woods has to offer.

This site was the first gift of land offered CNC and has two buildings- The Rowe Interpretive Building and the Krippendorf Lodge. The Rowe Interpretive Building consists of offices, a shop, a library and two auditoriums. It opens Monday through Saturday from 9 am to 5pm and on Sunday from 1pm to 5pm. The grounds are generally open from dawn to dusk but the hours of operation may change seasonally. The Krippendorf Lodge was constructed in 1899 and was named after Carl Krippendorf, who donated his land to the CNC before his death. This building comprises
offices of the marketing department of the CNC. Krippendorf Lodge is the perfect setting for a wedding reception, corporate retreat or social event. This beautiful structure has many adjoining rooms, a covered wraparound porch and a stone terrace. The lodge accommodates 100 guests inside and an additional 200 when using the porch and the terrace.

From the geological point of view, Rowe Woods has a venerable past. Once in the Ordovician Age, 450,000,000 years ago, an ancient sea washed over Rowe Woods and this led to the appearance of a limestone bedrock. Eventually the sea receded, and its layered seabed exposed as horizontal layers of earth. Additional layers of deposits built up and eroded many times. Slowly, the earth’s restless movements arched these layers up. Eventually the Ordovician sea floor was re-exposed at the surface. No one knows if, in the intervening years, emerging mammals foraged in the vegetation here. The ancient seabed, crowded with relics of early life, is the bedrock foundation of Rowe Woods. A cool, fresh water stream flows over the rock and new creatures crawl on the rocks and swim in the water.
**Summer Camps**

CincyNature Camp offered at the CNC is a special summer camp experience for children and youths of ages 3 to 12. The program is designed to provide enjoyable outdoor experiences for children and young adults, while promoting an awareness of nature and inspiring environmental values that last a lifetime. During the summer camps, young people enjoy a week or more immersed in the outdoors. Fresh air, hands-on activities, close encounters with animals, birds and plants, and increased knowledge of the natural world help build confidence and enthusiasm among participants.

Each camp requires pre-registration and pre-payment. Campers bring their lunch each day and one adult must sign all children in and out at the beginning and ending of each day. At this juncture, it is important to mention that the Cincy Nature Camp staff brings a variety of strengths and interests to the program. Talented summer staff members are recruited from around the country and then selected based on their enthusiasm and their experience with children as well as their knowledge of the environment. All staff members are trained in First Aid and CPR prior to the start of summer camps.

The first week of my internship was devoted to the training of all new staff, interns and volunteers recruited to work at the CNC summer camps.
Training included learning about Ohio natural history and the different CNC trails and habitats. We also used this week to plan the summer camps. The staff, interns, and volunteers brainstormed ideas concerning crafts, games, puppet shows, stories, songs and other activities we could use during the summer camps. All camp activities were directed by David Tennant. Four major themes were explored during the camps:

- A place to live
- Predator and prey
- Outdoor adventure
- Survival of the fittest.

**A place to live**: This camp was organized for children interested in hiking in the woods, sampling from a pond or turning over rocks in a stream. Campers learned about nature in different exciting and memorable ways through hands-on activities, puppet shows, arts and craft, games, songs, and specialized nature projects. The children for this camp range from 3 to 9 years. Camp activities were from 9:30 am to 2:pm. CNC members registered their children at the cost of $95 per child while registration for non members was $135 per child.
Within the week, campers visited natural habitats such as forest, field, stream, and pond. The investigation of the forest was to learn about the parts of a tree, how to identify trees, and the animals that live there; study of the field was to learn about insects and their adaptations, and the pioneer heritage of the CNC; exploration of the stream was to look for ancient fossils and study the animals living in this habitat; and investigation of the pond was to carefully collect plants and animals that live in the ecosystem. The topics emphasized during pond study were “adaptation” and “biodiversity”.

Predator and prey: Designed for children between the ages of 7 to 12 years, this camp started at 9am and ended at 2pm. Registration for members was $105 and $150 for non-members. Within a period of one week, campers took a close look at amazing and exciting animals. We explored the fields, forests, streams and ponds, searching for components of the food web. Predators and preys appear in all shapes and sizes- it may be an owl hunting a rabbit, a snake tracking a mouse or a ladybug hunting an aphid.

Campers learned how it feels to be both predator and prey. Through interesting activities, children learned to read animal tracks and pretended to be both hunter and hunted. We attempted to find reptiles and we learned about their interesting adaptations. In addition to the study of mammals,
insect predators and preys were also studied during this camp. Children explored the pond, stream, and field, and found many predators and preys of different shapes and sizes. Hiking through the woods, we realized that raptors (hawks, eagles, and owls) are fascinating predators. They prey on different kinds of insects, worms, snakes, small mammals, and other birds.

Outdoor Adventure: Designed for children between 6 and 12 years old, outdoor adventure ran from 9am to 4pm daily. Registration for CNC members was $155 and $220 for non-members. Most of the activities were outdoor so that these older children could have a better opportunity to explore and enjoy nature. The arrival of summer means it is time to get outside (away from the house and classroom); through both structured and casual activities, we used Rowe Woods as it was our backyard. In this extended day program, campers had time to dip with nets in the pond and enjoy a picnic near the stream.

During the “outdoor adventure” week, campers learned about Native American life. The staff dressed in typical Native American outfits and the children tried their hand at a practical activity such as tie dying that was practiced by Native Americans in the 1800s. We conducted a stream study, carefully sampling and examining of invertebrates; we also learned about
stream dynamics through varied activities. We presented a pond puppet show to give campers a better understanding of life in the pond. They had the chance to put together giant floor puzzles related to pond studies. On the final day of this camp, we combined and reviewed what we learned throughout the week in an exciting activity called “the ultimate”. This activity involved writing questions on a piece of paper and placing them at different spots along a trail in the woods. During hiking along the trail in assigned groups, children write down answers to all the questions. The first three groups to answer all the questions correctly are offered special treats at the end of the activity.

**Survival of the Fittest**: This was the last and most interesting week of the camp. It was designed for children between 10 and 12 years. Camp activities ran from 9.30 am to 2.30pm. Registration for CNC members was $135 and $205 for nonmembers. Campers were involved in such activities such as surviving out door for one night and providing for the three basic necessities of food, water and shelter. Other activities included reading the signs and stories of nature like the Native Americans, learning the basics of outdoor survival- how to find water, weather forecasting and shelter building. Arts and crafts were other enthusiastic activities for the “survival of the fittest”
week. Under the guidance of camp instructors and naturalists, students focused on habitats to create imaginary ecosystems. By using a variety of media such as water color paints, beads, clay and fibers, students created animals and insects of their choice. Campers were taught different methods in fire building and other fire related skills. They also practiced tie dying using white T-shirts. Children learned about a variety of survival skills: what to do if you get lost in the forest at night, meteorology, and orienteering.

At this juncture, I will like to make mention of some of my personal contributions at the CNC during my internship. I did a public power point presentation at Rowe Woods about the baobab tree. This tree is found on the continent of Africa, especially on the island of Madagascar. During my presentation I gave a brief summary of the structure of the baobab tree, its economic importance, medicinal value, and spiritual importance of the baobab. In addition to a public presentation, I also developed and presented a nocturnal program at the CNC known as “Glow in the Dark”. During this program I led a group of youths and adults on a night hike in search of plants and insects that glow at night, and also educated them on why and how some plants and insects glow at night. We also listened to and identified different sounds of birds, animals, and insects during this night hike through the forest.
Chapter 3

Long Branch Farm and Trails (LBF&T)

Background

In 1972, the former Secretary of Defense Neil McElroy and his wife, Camilla made a generous donation of their land to the CNC. Encompassing 581 acres of agricultural and natural land, the site is an invaluable teaching tool. Visitors to Long Branch Farm learn about its prize winning livestock, sustainable gardening and rare exposed layers of Ordovician fossils (http://www.cincynaure.org). Within its scenic pastures, meadows, woodlands, and crop fields, the practice of sustainable agriculture is nurtured and the heritage of this vulnerable land is preserved. Hiking trails wind through this unspoiled and peaceful area.

Mr. and Mrs. McElroy had a long standing interest in education and the natural environment. They gave their farm to the CNC so that children and adults may learn about the sources of our food and fiber and what it takes to produce them. In the years since, CNC has operated Long Branch Farm as an environmental education facility focusing on agriculture. Education barns were built across the road from the historic McElroy home, a trail was constructed along the O’Bannon Creek that flows through this area, an
organic garden has been established, a greenhouse built and a variety of animals added to the farm population.

Long Branch Farm is staffed by agricultural educators and farmers, and assisted by numerous volunteers. A unique curriculum has been developed by the staff that provides experimental in-depth learning which includes working with both large and small farm animals and plants. The goal is to help each visitor think of the farm in terms of a holistic approach, a web of interconnection and balance within the ecosystem. Long Branch Farm provides the opportunity to visitors to taste, touch, smell, and feel the reality of their food supply and also to know that all humans are dependent on the environment for survival.

Programs

Long Branch Farm has interesting programs on environmental education that attract both adults and students from many schools in the Cincinnati area. Some of their programs are: life needs, manure to muscles, Ohio history, global classroom, and genetics and reproduction.
**Life Needs:**

The objective of this program is to teach students about the basic needs of life required by all living things. These needs are water, air, food, space and shelter. Plants and animals need these things to grow, and humans depend on plants and animals to survive. During this program students participate in various activities that help them better understand the lesson. There is an activity that explains the role of photosynthesis in the growth of plants. In order to demonstrate the process of photosynthesis, students are assigned roles to represent different parts of a plant (leaves, stem, and roots). Then we explain how plants produce their food in the presence of sunlight. During this program, students visit the compost pile. They learn about decomposers that break down the garbage in the compost and how this garbage eventually becomes manure that is good for plants.

**Manure to Muscles:**

The main concepts taught in this program are food chain and food web, nutrient cycling, and interrelationships. The objectives are such that by the end of the lesson students should be able to:

- Understand that all food originates from green plants.
• Explain that green plants convert carbon dioxide and water to food using sunlight through the process of photosynthesis.

• Understand and give examples of producers, consumers and decomposers.

• Draw a food chain and food web and discuss energy flow.

• Describe how farm waste is converted into resources.

There are three main activity areas involved in this program- the composting area, the garden, and the food chain race.

At the composting area, there is a lot of hands-on interaction. Here students learn that decomposers, especially bacteria, break down anything that was once alive, turning it into finished compost. The finished compost provides organic matter that increases soil fertility. Students use shovels to turn over the garbage so as to see the decomposers. They also dump the garbage they have collected in their wheelbarrows in the compost. Other students may assist by shoveling the contents out of the wheelbarrows and spreading it over the compost pile. Students also use a thermometer to read the current air temperature and then compare with that of the compost pile. Students are made to understand that the temperature of the compost will be higher than that of the surrounding air because of the activities of the decomposers in the compost pile.
Another activity area for this program is the garden. Here hands-on activities and games will demonstrate concepts related to photosynthesis, and how green plants make their own food. Through photosynthesis, plants combine carbon dioxide, water and the sun’s energy to make sugar, which is the basic food for plants. This concept is demonstrated by playing the “factory game”. In this game, students sit down under a large green overhanging plastic cover that represents the leaf of a tree. They are divided into groups representing the different elements that plants combine to produce energy.

The food chain race is another interesting activity that is involved in this program. The items needed for this program are: 2 separate containers of balls labeled sun, 2 buckets labeled grass and soybeans, 1 bucket marked cow, and 3 bags for energy misers to signify lost energy in the food chain. Before starting this game, students are divided into 2 teams. One team will represent the sun, and soybean, while the other team will represent the sun, grass, and cow. The students assigned roles as energy misers will pick up all the energy (balls) that is lost through the food chain and place in the bags. At the end of the game, we realize that the food chain with three trophic levels lost more energy than the food chain with two trophic levels. This explains
the idea that as energy flows through one trophic level to the next energy is lost.

Ohio history:

This program was designed for Goshen elementary school. It focused on the Ohio history of the 1790s. It was carried out in the woods involving three characters: a settler, a Shawnee native, and a surveyor. These three characters were situated in different locations in the woods. I played the role of a surveyor. My equipment included: two rod survey chains, eight marking pins, a compass on a stake, a leather bound journal, a pencil, a Virginia Military District (VWD) warrant, and two staves. The role of the surveyor was to teach students how to survey; tell the history of changes in land area in Ohio; and to explain the problems experienced by surveyors in the 1790s with native Indians. The native Indians thought that visitors came in to take their land and so were very aggressive towards strangers. Students were very excited to practice surveying as was done in the 1790s.

The character of the early settler was modeled after Jacob Meyers, who is credited with being Goshen’s first settler. His equipment included: crosscut saws, an axe, a fire tripod, a wolf pelt, a wolf track maker, walnuts and blankets. The role of the early settler was to present to students a vivid
picture of how the environment was in the 1790s. Most of the forest was not yet destroyed by humans and technology was less developed. This character narrated to students how he had to work really hard in order to build a cabin or clear land for farming because of his crude tools. Students took turns to cut wood using a crosscut saw. The early settler also narrated to students how animals like wolves visited them at night since they lived in the forest. The wolves were very destructive creatures. The early settlers got a large portion of their needs from the natural environment. In satisfying these needs, the settlers changed the environment significantly from what it originally looked like. They cut down the forest for fuel and house construction, and also hunted wild animals for food.

The last character in this program was the Shawnee who represented the Native Americans. They were original owners of the land and were very aggressive towards the white settlers who came to take over their land. This character’s equipment included: a bison pelt, a mortar and pestle, beaver pelt, deer hides, gun, two knives, fire and a tomahawk. The Shawnee presented how life was different in the 1790s. The Shawnees and other Native Americans were pushed out of the land they lived on and used for hunting by the white settlers. Native Americans and European settlers had vastly different ideas about land ownership. Europeans carved out land into
pieces and sold to individuals, whereas Native Americans communally used land for many purposes. The settler and Shawnee characters both exemplify how people extracted almost all their needs from the natural environment.

The program about Ohio history was very exciting to students because all three characters dressed up and acted like people of the 1790s. Thus students could see a vivid picture of how people of that era survived and how they interacted with each other and with their environment.

Global Classroom:

This program was very exciting and informative to both students and teachers because it involved other cultures and people of the world. Some of the countries studied in this lesson include Ethiopia, Haiti and Thailand. Important concepts taught were:

- Carrying capacity of a population
- Sustainability
- Ecological foot print
- Conservation of natural resources.
“Global Classroom” has the following goals and objectives:

Goals: To explore ----

- The causes and consequences of unequal resource distribution throughout the world
- The impact of human activity on the earth.
- Human behavior such as war, gender roles, and family size in relationship to natural resources.

Objectives: Students will----

- List the basic life needs of all people.
- Be able to explain that all resources come from the environment.
- Be able to explain why common or shared resources are often depleted.
- Examine the reasons and ethics involved with meeting one’s own short term needs at the expense of long-term sustainability.
- Be able to sympathize with the plights of humans in other part of the world.
- Be able to demonstrate how inappropriate use of resources leads to soil erosion, specie extinction, air and water pollution.
Students were very excited in this program because there were many hand-on activities. They had the opportunity to fetch firewood and collect animal feces (manure) to put on the compost pile. Students also studied and analyzed pictures from other parts of the world, ate food not common in the United States, such as enjera (from Ethiopia), cassava bread (from Haiti) and rice (from Thailand). Besides learning about other cultures of the world, school groups visited and petted farm animals. Other exciting activities involved in “global classroom” are: water hauling, fishing for the future, illiteracy activity, and collecting cow dung. Water hauling involved students carrying water in gallons from a nearby pond to the farm building. This was to enable students to experience how people in the developing countries travel long distances to have water. Fishing for the future is an activity that demonstrates the fact that humans have to fish in a sustainable manner in order to avoid extinction. The illiteracy activity demonstrates the high level of illiteracy in Haiti as well as other developing countries of the world. Students collected cow dung using a shovel and wheelbarrow to put on the compost pile. They also learned that in some parts of the world, such as Ethiopia, people use cow dung as fuel, manure, and for house painting. Students had the opportunity to
explore different product boxes to learn about products that come from goats, cows, sheep, chickens and plants.

**Genetics and Reproduction:**

This program is very educational because it teaches a lot of facts on animal science. The program is designed for sixth grade students. The objectives of this lesson are:

- List several benefits of an agricultural society versus a hunting and gathering society.
- Explain in scientific terms how farm plants and animals reproduce (including artificial insemination).
- Explain the words genotype, phenotype, dominant, and recessive as they apply to genetics.
- Explain why farmers selectively breed for desired traits in livestock and plants.
- Explain how diversity ensures survival of some species in the event of environmental changes.

It is necessary to note that this program is similar to all other programs taught at the CNC. It involves many hands-on activities so children and adults can understand and retain important concepts, principles, and issues.
related to genetics and reproduction. Hands-on activities may include petting animals and birds, hiking through the woods, listening to the calls of different animals and birds, watching puppet shows, singing songs and playing games.

The lesson on genetics and reproduction involves activities explaining artificial insemination, genes, and diversity. The activity on artificial insemination is the most exciting to students. This is because students have the opportunity to see and experience how artificial insemination is performed, using a puppet (fake) cow for demonstration.

Important facts mentioned to students with regard to artificial insemination are:

- First and foremost, a bull’s sperm is purchased. The type of sperm selected depends on the type of breed wanted and the characteristics being looked for.

- When the bull’s sperm is purchased, it is delivered in a tank containing straws filled with the bull’s semen. The semen is frozen in liquid nitrogen (dry ice) at about –320F.

- One ejaculation of a bull can fill twenty straws. The straws do not need to hold the whole ejaculation because during artificial insemination the semen is deposited directly into the uterus, whereas
during natural insemination, the bull’s sperm has to travel through the
vagina to the cervix and then into the uterus.

- The benefits of buying only the semen as opposed to the whole bull
  are: it is less expensive; we can use the semen to fertilize many
  females; and we can sell the bull when no longer used for fertilization.

Besides artificial insemination, we do another activity to explain important
genetic terms such as dominant, recessive, genotype, phenotype,
homozygous, heterozygous etc. This activity is done in the form of a game,
using a board that illustrates crossbreeding between the angus bull and the
horned Hereford cow. This activity is called the Bb game. First we divide
the sperms(B) and eggs(b) evenly among the participants in the game (about
eight students). The egg and sperm are represented by cards marked b and B.
Then we have the students “mate” or “fertilize an egg” or “create a baby”.
Thus each egg has to pair with a sperm. At this point, we explain the terms
genotype, phenotype, dominant, and recessive. We also explain to students
that B is a dominant gene and b is a recessive gene. After crossbreeding, we
analyze the characteristics of the offspring, that is, what genes did the
offspring get from the mother and father.

There was another activity known as the “diversity game”. The
aim of this game was to enable students to understand the advantages of
diversity through crossbreeding of animal species. Crossbreeding leads to variety or diversity and in case of a disease or infection, more animals or plants will survive. Students also learn that crossbreeding does not only occur between animals but also between plants (cross pollination) through the help of insects. In addition to games, students had the opportunity to pet chickens, goats, cows, rabbits, and donkeys. They were also taught how different animals on the farm reproduce.

Animal Caring

Animal care and acquiring knowledge about animals at the CNC constituted a large part of my internship. All animals kept at Long Branch Farm & Trails were used for educational purposes. On the farm, all the interns were responsible for doing chores at least once a week, as well as other daily animal-care duties, such as providing water and food for the animals. One of the benefits of animal care in terms of teaching was that it enabled us to better answer specific questions about various animals due to one’s intimate knowledge of the animals. At Long Branch Farm, I was responsible for feeding chickens, rabbits, goats and bees. Bee food is a
mixture of water and sugar and is needed because bees cannot go out during
the cold weather to search for nectar to produce honey. Besides feeding the
animals, all interns were assigned to clean the cage and barns. In addition,
we learned how to handle some of the farm animals like rabbits, chickens,
cows, goats, and pigs, so that children could pet them during educational
programs.

Although the chores were tiring and often time-consuming, I found a
sense of satisfaction in a job completed. When doing chores, we fed and
watered all animals, collected eggs, milked goats and cows, and opened and
shut down farm buildings. There were always a million and one surprises,
which did and could happen, such as chasing a sheep or bull that broke
through the fence, or cleaning out the beehives. The Education Director and
Farm Manager kept us informed of daily/weekly changes in chore duties.

The most important things I learned in caring for the farm animals were
how animals are raised organically and that farming is no walk in the park. I
was fascinated by the farm during my internship because it was such a new
learning experience. I got to see how artificial insemination is done to cows
as well as how a polyculture helps reduce disease among animals. Most
importantly, I was able to pass on the knowledge I gained to students who
enrolled for programs or who visited the farm.
Animal Feeding

There are six basic nutrients that all animals need: water, minerals, vitamins, proteins, carbohydrates, and fats. Grasses and legumes provide the bulk of plant food for farm animals. Grains are the seeds of certain plants in the grass family. Legumes include soybeans and peanuts. Below are some of the common animal foods at Long Branch Farm & Trails:

**Corn**: A high carbohydrate grain, corn is plentiful and economical. It helps animals grow quickly.

**Oats**: High in carbohydrates and fats, oats help animals grow and provide quick energy. Oats are served to both growing and mature animals, including both cows and calves before and after calving. Expectant cows need quick energy to help them provide milk for their calves (lactation).

**Barley**: A good finishing feed, barley is fed in conjunction with corn, especially for animals that are used for show.

**Bran**: Used as a laxative, bran is fed to cows before and after calving. It is fed to animals on a high grain-diet to keep them from getting constipated. Bran is the roughage part of wheat or oats and has no nutritional value; it replaces the roughage that animals otherwise acquire through grazing.

**Silage**: Silage is a fermented product derived from green cornstalks, leaves and cobs with kernel; it is chopped and stored in a silo. It is good winter
food, especially for cows in gestation or those with calves. Silage is high in proteins.

**Hay**: Made from certain types of grasses which are cut while immature and then dried in the sun, hay is used in the winter when grazing is poor or when animals have no access to grazing pastures. It is cheap and given freely to those animals that can digest cellulose, such as goats, cattle, horses, and sheep. Straw resembles hay but it is used for bedding, not food. Straw is made from oats or wheat and is harvested after it is dry and the seeds (grains) have been removed.

**Supplemental foods**: The amount and types of supplements vary according to an individual animal’s needs, but may include protein supplements such as linseed pellets, soybeans or calf manna minerals, vitamins, and salt.
CHAPTER 4

Observations and Recommendations

Observations

I found my internship with the Cincinnati Nature Center to be an interesting learning experience even though it was physically and mentally exhausting. There were many opportunities to learn new things and to improve my teaching skills. The Nature Center has a well-educated and experienced staff that is always willing to answer questions. Through the teaching experience, I greatly expanded my knowledge about environmental education. Even negative situations turned out to be valuable learning experiences for me. I learned how to interact respectfully with other staff members and volunteers, which is an important aspect of succeeding in any job. I attended staff meetings and other planning meetings involving other departments, which gave me a better understanding of what takes place behind the scenes at the CNC. Participating in planning meetings with other staff in the finance, marketing and, communication departments, as well as with experienced naturalists and environmental educators, was a special learning experience for me.

Perhaps the most valuable thing gained during my internship was the realization that to be a successful environmental educator you have to be a
good classroom manager. Most educational authorities would agree that the most effective learning takes place through learner-centered activities. However, these conditions do not just happen. A teacher has to be able to effectively manage the time and resources available to him or her in order to create the best possible learning condition for each student in class. The teacher needs to schedule different times for students to be on computers, watch a movie, play a game, etc., so they are not bored with academic work all the time. Some teachers encourage outdoor education so as to provide students the opportunity to get out of the classroom and experience nature.

**How the Institute of Environmental Sciences applied to my internship**

I believe that the core courses and the internship option in Miami University’s Institute of Environmental Sciences (IES) program have been invaluable in helping me to personally work toward the achievement of the goals of environmental education. The program’s core courses provided me with an understanding of the complexity of society’s environmental problems. Consequently, during the internship, I could talk confidently with school administrators, teachers, naturalists, and environmental educators who had the time and interest in discussing these problems as they pertain to environmental education and interpretation. Perhaps the most valuable aspect of the IES program was the opportunity to spend six months as an
environmental education intern gaining varying real world experiences in promoting environmental education programs at the CNC. The internship actually helped me to understand the different components and complexities involved in realizing a successful environmental education program, as well as clarifying my own perception of what constitutes environmental education.

The improved writing skills I developed during my time at IES were invaluable when writing my lesson plans, as well as my monthly reports and this final report at the end of my internship. The IES problem-solving process proved to be very helpful because, when defining a project or writing lesson plans, it is necessary to set clear goals and objectives. I applied knowledge gained from my Public Service Project (PSP) on the Mill Creek watershed awareness effort during my internship because the former involved developing an education program for the residents of Colerain township. In the same line, I was involved in developing different educational programs during my internship. Finally, the knowledge I acquired about various environmental issues from courses taken at IES enabled me to better answer questions from students and non-students about the environment.
Recommendations

Due to the fact that environmental problems exist in all nations of the world, environmental education should be an integral part of every nation’s educational process. It should be centered on particular environmental issues to form a sense of values in people, contribute to public well being, and promote the survival of all humans. Based on my internship experience, I propose the following recommendations to the Institute of Environmental Sciences and also to the Education Department at the CNC.

1. The Institute of Environmental Sciences should encourage students who intend to focus on environmental education as their area of concentration, to take one or more courses in the School of Education that deal with techniques in teaching and classroom management.

2. IES should consider expanding and upgrading their collection of environmental education books and materials found in the departmental library. Although there are many general books in the IES library, the department needs to increase their stock of books related to the development of environmental education programs, curriculum guides and books which offer learner centered activities.
3. I also recommend that IES students who intend to intern in environmental education should try to have some teaching experience prior to their internship if possible. This experience is important so as to gain skills that can be applied to outdoor education. Any form of indoor or outdoor teaching experience will help during the internship as would-be interns will acquire basic skills in developing and utilizing environmental education curricula.

4. The CNC should consider increasing the orientation period for interns from two to three weeks in order to give interns an opportunity to master the different trails at both sites as well as get used to the animals used for the programs. It will be helpful for the old and new volunteers to have orientation together with the interns so as to share experiences and get to know each other better before the actual start of the internship.

5. The CNC should do training for each new lesson at least twice for both interns and volunteers about a week before the lesson is taught to school groups. I make this recommendation because some of the programs taught like “Manure to Muscles” and “Genetics and Reproduction,” are science-based and require more than one training session to master.

6. Some elementary school students have the misconception that their visit to the CNC is basically to pet or play with farm animals. Consequently, it is
necessary for the Education Department at the CNC to inform the visiting schools ahead of time of the content of the lesson for that day so the teachers and students know what to expect. For example, the CNC should inform the school of activities involved in the lesson such as puppet shows, games, songs, and other details of the program. It also may be important for whoever is in charge of contacting the visiting school groups to inform the environmental educators and interns of what to expect character-wise from the students in order to avoid any surprises or embarrassments.

7. The wagon rides offered at the Long Branch Farm & Trails seem to be an exciting experience to school groups that visit the Nature Center. Thus, I recommend that school groups be transported on the wagons uphill to the farmyard and downhill to the school buses at the end of every program. Doing so would increase and enrich the experiences of the visitors and make them feel like coming back many times. In fact, driving the wagon was a new fun experience, and I derived a lot of pleasure doing it during my internship.
References


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