ABSTRACT

Report on a MTSC Internship at the Hefner Zoology Museum

by Corinthia P. Que

This report describes my internship at the Hefner Zoology Museum, Miami University, Oxford, Ohio. It is divided into four chapters. Chapter 1 describes the museum’s organizational structure and my roles as an intern. Devoted to natural history and focusing on environmental education, the museum serves Southwest Ohio through exhibits and educational programming for various audiences: Miami University students and faculty; K-12 teachers and students, and the general public. As an intern, I developed the web site for the Center for Environmental Education and Natural History (to which the museum belongs), edited lesson plans for online access, and performed operational duties at the museum. Chapter 2 describes the purpose and outcome for each assignment, while Chapter 3 discusses in detail how I created the web site. Chapter 4 reflects on how I used project management principles to complete my projects in the context of the museum’s organizational structure and culture.
REPORT ON A MTSC INTERNSHIP
AT THE HEFNER ZOOLOGY MUSEUM

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# Table of Contents

Acknowledgments ........................................................................................................................ iv  

Chapter 1: Introduction ..............................................................................................................1  
  Organizational Structure .............................................................................................................1  
  Museum Staff..............................................................................................................................2  
  Work Culture .............................................................................................................................3  
  Outreach and Interaction With External Organizations ...............................................................3  
  My Roles as Museum Intern .........................................................................................................4  
  My Work and the Museum’s Mission .........................................................................................5  
  Interaction with My Mentor..........................................................................................................5  
  Organization of this Internship Report.........................................................................................5  

Chapter 2: Overview of the Internship ......................................................................................7  
  Developing the Center for Environmental Education and Natural History (the Center) Web Site ....8  
  Building an Online Environmental Education Resource for Teachers .......................................11  
  Participating in Operational Activities in the Museum ...............................................................14  
  Work Routine..............................................................................................................................17  

Chapter 3: Developing the Center Web Site ...........................................................................19  
  Conducting the Front-End Analysis.............................................................................................19  
  Creating a Site Map ....................................................................................................................20  
  Developing a Project Plan..........................................................................................................22  
  Writing, Reviewing and Revising...............................................................................................22  
  Conducting the User Test..........................................................................................................26  
  Integrating the Teaching Tools Web Pages ..............................................................................27  
  Acquiring Copyright and Logo Permissions.............................................................................28  
  Writing the “Knowledge Transfer” Document ...........................................................................29  
  Launching the Web Site.............................................................................................................29  

Chapter 4: Applying Project Management Principles at the Hefner Zoology Museum .............30  
  Defining Project Management.....................................................................................................30  
  Evaluating Against Project Management Success Factors .......................................................33  
  Applying the Project Plan to the Learning Organization .............................................................36  
  Concluding Thoughts................................................................................................................41  

References....................................................................................................................................42  

Appendices  
  Appendix 1: The Center Web Site Project Plan ........................................................................43  
  Appendix 2: Teaching Tools Project Plan ..................................................................................44  
  Appendix 3: Old Center Portal Page..........................................................................................45  
  Appendix 4: Front-End Analysis of the GTI Web Site...............................................................46  
  Appendix 5: Front-End Analysis of the HZM Web Site..............................................................47  
  Appendix 6: New Center Portal Page........................................................................................48  
  Appendix 7: New Center Homepage ........................................................................................49  
  Appendix 8: Hefner Zoology Museum Homepage ...................................................................50  
  Appendix 9: Sample Original Lesson Plan ............................................................................51
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My Lord and Savior, Jesus Christ—from whom all these blessings come, and through whom all things are made possible. His timing is always perfect.
Chapter 1

*Introduction*

This report describes my experiences as a Museum Intern at the Hefner Zoology Museum at Miami University, Oxford, Ohio. The internship is part of the curriculum requirements for the Master of Technical and Scientific Communication (MTSC) program at Miami University. My internship with the museum spanned 17 weeks, from January 8 to May 7, 2004.

The Hefner Zoology Museum is dedicated to animal natural history with an emphasis on environmental education. It serves as a resource for Miami University faculty and students, Ohio K-12 teachers and students, and the general public. In this chapter, I describe the museum’s organizational structure, staff, and work culture; my roles as a museum intern; the ways in which my work supported the museum’s mission; and my interaction with my mentor.

**Organizational Structure**

The Hefner Zoology Museum is part of the recently established Center for Environmental Education and Natural History (the Center) at Miami University (see Figure 1). Two other major components make up the Center: the GREEN Teachers Institute (GTI) and the Biosphere Project. The GREEN Teachers Institute summer workshops are professional development courses for K-8 teachers that give them the training and content knowledge necessary for teaching science and environmental themes in their classes using inquiry-based methods. The Biosphere Project is the Center component through which environmental science texts and related educational materials are produced. Aside from these three components, the Center also includes conservation projects; the physical spaces occupied by the Center; and its educational resources, both printed and online.

Much of the Center’s conservation efforts are undertaken in concert with two non-profit organizations that are loosely associated with the Hefner Zoology Museum: Tasbayam, based in San Jose, Costa Rica, and The Oxford Society, based in Oxford, Ohio. These organizations, run...
independently of the Center, support the Museum’s conservation and environmental education projects in Costa Rica.

**Organization of the Center for Environmental Education and Natural History**

**Hefner Zoology Museum**  **GREEN Teachers Institute**  **Biosphere Project**  **Conservation Projects (Through the Oxford Society and Tasbayam)**

**Figure 1.** Chart showing how the Center’s main components are organized.

**Museum Staff**

The museum staff is comprised of four permanent members, one visiting elementary school teacher, two interns (including me), and graduate and undergraduate student assistants. Dr. Donald Kaufman heads the staff as museum director; Mike Wright, assistant director, directs the GTI summer workshops and coordinates school groups visiting the museum. Cecilia Franz Berg, Senior Project Director, oversees the museum’s projects and funding, and Lisa Rosenberger, my writing mentor, is the Grantwriter and Environmental Education Specialist. In my internship, I also worked closely with
Don Koller, a 5th-grade teacher then on sabbatical with the museum, who created lessons and activities related to the museum’s exhibits. Adriane Carlson, the other intern at the time, worked on science education and marketing projects, and the rest of the student assistants provide operational support, including cataloguing museum specimens, clerical work, and research.

**Work Culture**

Museum staff members are experts in their fields and are thus self-directed workers in a cross-functional team. The staff meets weekly to discuss work progress and receive suggestions. In these staff meetings, general museum duties, such as docentship for visiting groups and Sunday opening hours, are also distributed on a voluntary or rotation basis. Most of the written work by staff members is reviewed by Lisa or Cecilia to ensure that the style is consistent with the museum’s voice and policies. In this way, the writing process follows a hierarchical organizational structure, but in most other ways the organization has a relatively flat structure with members working with a high degree of autonomy.

As a museum intern, later also designated as “interim webmaster,” I worked as another team member with my own specialty area: writing, editing, and web design. I consulted with the staff often, particularly with Don Koller, who served as one of my subject matter experts (SMEs); Lisa, my writing mentor and reviewer; and the rest of the senior staff.

**Outreach and Interaction With External Organizations**

The Center works with external organizations in two ways: through outreach programs and through partnerships with funding organizations.

The Center conducts outreach programs for a wide range of audiences. Included in these programs are some of the GREEN Teachers Institute workshops conducted in various locations outside Miami University (for example, in Clermont County), lectures given by museum staff
members at different schools, and the Science Alliance program headed by Adriane Carlson. In this program, Miami graduate students give hands-on science lessons in their area of expertise at the request of K-12 teachers in the Oxford area. Many outreach programs for the general public are conducted through the Hefner Zoology Museum in cooperation with local organizations, for example, participation in the Earth Fest sponsored by the City of Oxford, a nature walk in cooperation with the Butler County Board of Mental Retardation and Developmental Disabilities, and a presentation about the concept of “Home” to a group of Girl Scouts.

Many of the Center’s programs and activities are supported by grants from Miami University and from private companies such as Cinergy and Procter and Gamble. Additionally, the Center actively seeks funding from public and private grantmaking institutions such as the Molyneaux Foundation, the Institute of Museum and Library Services, the Ohio Environmental Education Fund, and local school districts (Mason City Schools, Clermont County Schools). The museum also established the Friends of the Museum fund for donations from private individuals.

**My Roles as Museum Intern**

I was initially hired to work on three projects: developing and writing fundraising materials for the Imaginarium, an early childhood education center; editing Don Koller’s lesson plans (later called Teaching Tools) and making them available online through the museum’s existing Virtual Tour; and revising the Hefner Zoology Museum (HZM) and GREEN Teachers Institute (GTI) web sites. We had slow progress with the design vendor who created the initial Imaginarium drawings necessary for writing fundraising materials. Thus, I was not able to work on this project until the last week of my internship. I therefore spent most of my internship working on the latter projects. The two web projects evolved into my major project, developing the Center for Environmental Education and Natural History web site. I discuss these projects in further detail in Chapters 2 and 3 of this report.
My Work and the Museum’s Mission

The work that I accomplished during my internship furthered the museum’s mission by providing environmental education resources that are more widely accessible by the public. These resources include museum visitor information, resources for teachers and students, and links to other environmental education sources.

In establishing a stronger online presence for the museum, I also provided support for the museum’s grant-seeking activities. We recognize the support of funding institutions on the new web site through placement of their links and icons. In turn, the site allows them to see in concrete ways the activities that their funds support. Further, sponsor links on the site help us to show prospective funding organizations, especially those from commercial industries, how they, too, will be featured on our web site when they make a contribution.

Interaction with My Mentor

My mentor, Lisa Rosenberger, a MTSC graduate from Miami University, worked in various writing and editing capacities before joining the Hefner Zoology Museum as Grantwriter and Environmental Education Specialist. I met with her weekly and as needed to review my written work and to giver her updates on the progress of my projects. Lisa edited my writing so that it reflected the museum’s style. She also handled situations that needed diplomatic intervention with my SMEs (other museum staff members) as they arose. Examples of these situations include distributing work and pushing deadlines.

Organization of this Internship Report

This internship report is organized into four chapters. This brief introduction to my internship and the organization is followed by the second chapter, which describes the projects I worked on during the
Internship—focusing on each project’s audience, purpose and outcome. In the third chapter, I discuss my major project, developing the Center for Environmental Education and Natural History web site, describing in detail the steps I took to complete the project. The fourth chapter reflects on my application of the project management principles I learned in the MTSC program in the context of the Hefner Zoology Museum’s organizational structure and culture.
Chapter 2
Overview of the Internship

My internship at the Hefner Zoology Museum was comprised of two major activities and several smaller operational activities that are part of running the museum. I spent approximately 40% of my internship on developing the web site for the Center for Environmental Education and Natural History (the Center), 40% on editing and building the Teaching Tools (TT) web pages, and 20% on other activities (See Figure 2.).

Figure 2. Time spent on major projects throughout the internship. Other activities included operational activities for the museum, such as assisting with school group visitors and writing museum correspondence.

Appendices 1 and 2 (pp. 43 and 44) contain my project plan for the two major activities (Developing the Center web site and the Teaching Tools pages). Anticipating progress and therefore more work on the Imaginarium project towards the end of the internship, I scheduled the Center web site and TT web pages to finish early, allowing flexibility in case other projects or problems that needed more attention arose. In the following sections, I describe each of my projects and other assignments. The
Developing the Center for Environmental Education and Natural History (the Center) Web Site

My major project was developing the new Center web site, accessible through http://www.environmentaleducationohio.org. Before I started work on the web site, the Center home page (see Appendix 3 on p. 45) served as a portal page, with links to the following:

- Hefner Zoology Museum (HZN) web site
- GREEN Teachers Institute (GTI) web site
- EEOhio web site (an independently maintained site hosted by the Center)
- Science for Ohio web site (an independently maintained site hosted by the Center)
- Biosphere 2000 web site
- Center Programs and Activities page

The primary audiences for the Center web site (comprised of the components listed above) includes Miami University students and staff; K-12 students, teachers, and parents; and the general public. Secondary audiences include non-Miami researchers and scholars who might use the museum’s collections, as well as funding organizations that support the museum or to which the museum submits grant applications. The overall goal for redeveloping the web site, then, was to make it an accessible and comprehensive resource for these audiences.

Defining Major Project Tasks

As I took on the web development project, I divided the work into major tasks. My first task was to reorganize the portal page (see Appendix 3 for a copy of the old page) and the site architecture to better reflect the organization of the Center. This task was supported by a new visual design that I created with the help of Mike Wright, the museum’s assistant director. The new site architecture is
based on the initial concepts of a student assistant, Collin Dawson. A second task was to revise the HZM and GTI web sites, which were comprised of four and two web pages, respectively, in order to make these sites a more comprehensive resource and to better represent the work of the Center to our audiences. A third aspect of the Center’s site is the Biosphere 2000 web site, which has since been renamed the Biosphere Project. This site is dedicated to environmental science books that the museum staff has authored. The site includes case studies that accompany Protecting Your Global Environment, a textbook for senior high school and undergraduate students. Although I was not tasked with revising the text for this site, I edited some of the main pages to fit with the new site’s visual design and navigational architecture.

Creating the Development Plan

Having been assigned by my mentor, Lisa, to lead the web development project, I created a development plan that listed the specific steps that needed to be accomplished; the persons responsible for each step (designing art, drafting, reviewing content, copyediting, and testing); and the deadlines for each step (see Appendix 1 on p. 43). I led several planning meetings in the first few weeks, during which part of the work was dependent on other museum staff members. Starting with the fifth week, I worked largely on my own. The following lists the process I followed in developing the Center web site:

1. Conducted a front-end analysis that detailed the current web sites’ characteristics, the objectives for the new site, the site’s audiences, and a primary list of web pages (see Appendices 4 and 5 on pp. 46 and 47 for copies of the HZM and GTI front-end analyses).
2. Created a project plan.
3. Conducted planning meetings with Lisa and Mike, who were the two other main contributors in the initial stages of the project.
4. Drafted text for the web site using MS Word.
5. Submitted the text for review to Cecilia and Lisa.
6. Created the site layout using Fireworks and Dreamweaver.
7. Incorporated the reviewed drafts into the new layout.
8. Added pictures and other graphics to the web pages as needed.
9. Uploaded the site for the user test.
10. Conducted a user test.
11. Submitted the web site to Lisa for copyediting.
12. Gathered permission to use logos from sponsors and related groups that appeared on the web site.
13. Revised the web site based on copyedits and user test.
14. Created a “knowledge transfer” document—a detailed description of how I created the web site and instructions for updating selected components of the web site.

**Project Results**

The result of these efforts is a new Center web site that has an easy-to-understand organization and navigational system, an attractive and simple visual design and layout, and comprehensive information for our diverse audiences. In place of the old portal page, I created a new portal page and a Center home page (see Appendices 6 and 7 on pp. 48 and 49). The portal page contains a large Center icon with links to the Center’s main pages and sub-sites for the three major entities under the Center: the Hefner Zoology Museum, GREEN Teachers Institute, and Biosphere Project. The lower portion also contains smaller icons that link to the following independently maintained web sites:

- Science for Ohio, an educational resource maintained by John Farmer, a GTI instructor, in connection with the GREEN Teachers Institute introductory-level workshop, *Science for Ohio.*
- EEOhio¹, web site for the Center for Environmental Education in Ohio (an organization separate from the Center at Miami). The Center at Miami hosts the EEOhio web site.

¹ EEOhio, the Center for Environmental Education in Ohio, grew out of the implementation of *Ohio EE 2000: A Strategic Plan for Environmental Education in Ohio* published in 1999.
Costa Rica, web site for the Costa Rica Project, a partnership between the Oxford Society and Tasbayam (based in Costa Rica) that grew out of the GREEN Teachers Institute master level workshop, *Cultural and Natural History of Costa Rica*.

The Center home page, unlike the portal page, follows the same template as the rest of the Center web site. Users can access the three sub-sites (GREEN Teachers Institute, Hefner Zoology Museum, and Biosphere Project) by clicking on the button tabs along the top banner and the tabs for the Calendar of Events and the Contact Us pages. Within each sub-site, users can access the pages through links on the left navigational bar (see Appendix 8 on p. 50). I completed the Center web site and uploaded it on March 31, 2004 for the user test. The Center web site is discussed in more detail in Chapter 3.

**Building an Online Environmental Education Resource for Teachers**

The second major project that I undertook in my internship was building the Teaching Tools (TT) web pages, which are teaching resources linked to each exhibit in the museum’s Virtual Tour (http://www.environmentaleducationohio.org/VirtualTour/virtualtourhome.htm). The Virtual Tour features the following museum exhibits:

- **Animals of Southwest Ohio**, a wall mural by Mike Wright featuring animals found in the region.
- **The Vernal Pool: A Spring Phenomenon**, a diorama depicting a vernal pool (seasonal wetland) and its inhabitants.
- **What's In A Name? Classifying Organisms**, a two-part exhibit featuring the animal classification system. Part 1 examines how scientists classify organisms and Part 2 focuses in on a particular animal grouping that will change yearly. Currently, it features cnidarians and sponges.
- **Animal Phylogenetic Tree**, a poster showing how animals are related through evolution.
- **Touch Boxes**, wooden treasure chests containing specimens that museum visitors can handle.
- **The Egg Case**, a chest drawer containing a collection of various eggs and nests.
- **The Naturalist's Desk**, an exhibit featuring the office of a naturalist working in the 1800s.
- *The Web Of Life*, a three-part exhibit looking at the interconnectedness of all life through time, space, and animal interactions.

- *Home: We All Live Somewhere!*, a gallery featuring different animal homes, both natural and man-made.

- *Environmental Modification*, a three-part exhibit showing how humans and animals modify the environment and how human modifications affect other organisms.

- *An Environmental Ethic*, an exhibit asking visitors to reflect on environmental practices.

- *The Center Cabinet*, a system of cabinets and shelves currently housing a mollusk collection.

- *The Francis Room: Hoofs, Horns, Antlers, & Claws*, a collection of game animals from around the world focusing on diversity and wildlife education.

Don Koller, a fifth-grade teacher on sabbatical with the museum, has completed activity-based lesson plans designed for each of these exhibits, except for *Animals of Southwest Ohio*, *An Environmental Ethic*, and *The Center Cabinet*. These lesson plans combined hands-on, inquiry, and research elements to teach subjects related to each exhibit. The idea for making these lessons available online via the Teaching Tools pages came out of a GREEN Teachers Institute workshop, *Museum Resources for Teachers*. This workshop highlights how K-8 teachers can use informal education resources, such as museums, as part of their curriculum. Teachers requested that lessons related to the museum’s exhibits be made available online. The TT pages, we hoped, would encourage teachers to take their classes to the museum by suggesting ways in which the museum’s exhibits can fulfill curriculum requirements. Further, the online lessons would allow students to continue exploring themes featured in the museum’s exhibits long after their museum visit, thus supporting another goal of the workshop.

**Revising and Adapting the Teaching Tools Pages for Online Access**

The starting drafts for the lessons consisted of a lesson plan, written largely in narrative style (see sample draft in Appendix 9 on p. 51); worksheets and handouts for students; and background information materials for teachers (usually photocopies or printouts of online articles). Therefore, the
first part of this project entailed editing the original lessons, implementing a new, easy-to-read layout and using a more instructional style of writing. The following lists the activities I performed to complete this project:

1. Created a style guide and an MS Word template based on this style guide (Appendices 10 and 11 on pp. 52 and 53).
2. Rewrote the lesson plan in an instructional style and edited it for completeness, for example, in the list of materials needed for the lesson.
3. Verified and updated the web references for each lesson.
4. Reformatted book citations to follow APA style and made their descriptions uniform in format.
5. Converted the lesson plans, handouts, and teacher’s materials to PDF format and created hyperlinks in the lesson plans to the related documents.
6. Created the Teaching Tools (TT) page for each exhibit.

**Project Results**

Appendix 12 (p. 54) shows an example of a final Teaching Tools page, accessible online at http://www.environmentaleducationohio.org/VirtualTour/TeachingTools/classifyingtt.htm. Each TT page lists one or more activities related to the linked exhibit, in this example, the Animal Classification exhibit. A short description for each activity is at the top introductory section, and each lesson has its own sub-section farther down the page through which teachers can learn more about the lesson as well as download the lesson plan and accompanying materials. Navigational features include a jump menu at the top left portion through which users can jump to other exhibits’ TT pages, and a link back to the specific exhibit’s page in the Virtual Tour. Other user-centered features include the following:

- Anchor links from the short descriptions of each lesson to the more detailed section down the page through which teachers can access the lesson plan and related materials
- Back-to-top buttons beside the title of each activity
▪ The option to download the entire teaching packet as a zip file, or to download the lesson and related materials separately

I uploaded the TT pages as they were created. By the end of the internship, I had completed editing and uploading 31 activity-based lessons to the Teaching Tools pages. These lessons included zoology, environmental science, art and social studies, and other topics that are directed towards K-8th grade levels. All exhibit pages on the Virtual Tour were linked to the TT pages on April 30, 2004.

**Participating in Operational Activities in the Museum**

Aside from my two major projects, I also performed several other tasks that are part of the museum’s operational activities:

▪ Researched science topics for the Imaginarium project
▪ Researched background information for grant proposals and fundraising materials
▪ Wrote and/or edited other museum communications
▪ Participated in staff meetings/decision-making
▪ Assisted with visiting school groups
▪ Opened the museum for Sunday hours
▪ Assisted other staff with Web and desktop publishing technology

**Researched Science Topics for the Imaginarium Project**

As mentioned earlier, my major projects were to include work with the Imaginarium, but this project turned out to be a smaller assignment because of the slow progress of the project overall. During Summer 2003, I had worked on this project in its conceptual phases in a separate independent study, in which I created several ideas for exhibits that have now been refined by the rest of the Museum staff. During my internship, I worked on writing detailed descriptions for two of the exhibit concepts. We gave these descriptions to our design vendor so that their artists could create drawings and design the technology and materials needed to create the exhibits. In writing these descriptions, we wanted to
ensure audience appropriateness and ease of use of the exhibits, as well as the scientific accuracy of the objects in the exhibit, for example, the correct type of tree and bird species we wanted to feature in our climb-in bird’s nest model, and the correct structure for the beehive model (see Appendices 13 and 14 on pp. 56 and 57).

**Researched Grant Proposals and Wrote Fundraising Materials**

A second category of activities I performed during my internship was researching for grant proposals and writing fundraising materials. Upon request, I researched background information about grantmaking organizations and their contact persons. On one occasion, I researched Chiquita Banana Company, their connection with environmental organizations and their work in Costa Rica, in preparation for a meeting with one of their corporate responsibility representatives. I had the opportunity to attend this meeting and interact with the representative. In the final week of my internship, I created a template for one-page information sheets about each of the museum exhibits and Center projects. These sheets will comprise a portfolio to be submitted to prospective donors; in addition, the one-pagers may be used singly, for example, as an attachment to a solicitation letter for a particular exhibit or project. By the end of my final week as an intern, I had completed one-page info sheets about the Center for Environmental Education and Natural History, the Imaginarium Project, and the Costa Rica Project (see copies in Appendix 15, pp. 59-61).

**Wrote Other Museum Communications**

I also wrote a few other museum communications. An example is the letter to Museum Resources 2003 participants announcing the completion of the Virtual Tour web site. I wrote this letter as if it were coming from Dr. Don Kaufman, the museum director, and in doing so tried to emulate the style of previous museum communications. I co-signed the letter as creator of the web site. Other communication duties involved copyediting and writing internal documents. I was asked to copyedit an internal document describing the Center to University audiences, to write staff meeting announcements, and others.
Participated in Staff Meetings

As an intern, I participated in weekly meetings. I updated the staff on my work, made suggestions for others’ projects, and sometimes voted on decisions such as whether or not the museum should participate in certain outreach programs.

Assisted With Visiting School Groups

I assisted in several school visits at the Hefner Zoology Museum. I often had the opportunity to observe or assist as other staff used the Teaching Tools lessons I had edited, and these observations served as an informal “user test” for the lessons. Occasionally, we found areas where Don Koller and/or I needed to improve the directions, add additional handouts or background information, and correct typographical errors. In other school visits, I took on the role of photographer, particularly during the Third Street Preschool visit, in which I took individual pictures of the students who visited. We gave them these pictures as souvenirs. These students are special-needs children, and I had the opportunity to observe the interactions of the museum staff with this special group.

Opened the Museum for Sunday Hours

During the academic year, the museum opens on Sundays from 1-4 p.m. The staff rotated museum duty for these hours, and I came in on two Sundays during my internship to open the museum. I noted the number of visitors who came on the museum calendar. The museum records the number of annual visitors as an indicator of our service to the local community. This value is reported in annual reports and some grant applications.

Assisted Other Staff With Web and Desktop Publishing Technology

Finally, as the person most experienced with computer technology on the staff, I became a ‘go-to’ person when others experienced technical difficulties with their desktop applications. My biggest involvement in this regard was assisting Don Koller in setting up the Costa Rica web site, accessible through the Center portal page, which he authored in Microsoft PowerPoint before converting it to Dreamweaver. He had no prior experience with Dreamweaver, but he quickly learned the steps to
build the web site. I also often helped my co-intern, Adriane Carlson, troubleshoot word processing and image editing problems.

These operational activities rounded out my internship experience at the museum, allowing me a full appreciation for what is involved in running such an organization.

**Work Routine**

The previous sections discussed my activities as an intern at the museum. This section briefly shows how I managed these activities through a “snapshot” of a typical workweek. After a two-week period of discovering and defining my roles at the museum, I quickly settled into a routine, working closely with Don Koller (a 5th-grade teacher on sabbatical with the museum), Lisa Rosenberger (my mentor), and Cecilia Franz Berg (Project Director) on the Teaching Tools and Center web site projects.

A typical workweek in the first two months of my internship proceeded as follows:

- **Monday**
  
  I performed a comprehensive edit on the first draft of the Teaching Tools (TT) lesson plans and handouts prepared by Don Koller. To standardize the format, I created and used a document template for all the lesson plans, which were two to three pages long. The handouts, on the other hand, varied according to the demands of each lesson and were less standardized. Examples of handouts included illustrated dichotomous keys\(^2\) for classifying skull specimens and other objects, student observation worksheets, coloring pages, and create-your-own storybook templates. I submitted the edited documents to Don for content review at the end of the day.

- **Tuesday**
  
  I worked on the Center web site by writing text drafts in MS Word and submitting the drafts to Cecilia or Lisa as each copy was completed. As the drafts were approved, I laid out the text in Dreamweaver.

\(^2\) A dichotomous key is a tool for identifying animals, plants, and other objects based on observable characteristics.
Wednesday

Wednesdays were reserved for revising the TT lessons. Depending on the complexity of the lesson plan and the revisions, I either resubmitted the updated drafts to Don for a second review, or I directly submitted the completed drafts for copyediting to Lisa. Also, staff meetings were usually held around 1 p.m. on Wednesdays, although these were at times cancelled due to unavailability of some staff members.

Thursday

As I was waiting for Lisa’s edits, I spent Thursdays working on the Center web site. During this time, I gathered photos for the site and created graphics, such as an interactive history navigation bar. I also corresponded with our funding organizations to obtain guidelines for using their logos and linking to their web sites.

Friday

Fridays were usually spent incorporating Lisa’s edits. At the end of the day, I sent the drafts to Don Koller for final review and approval. In some instances, questions about content and style arose, and Don, Lisa, and I met to discuss and resolve the remaining issues.

The schedule described above remained fluid, as some time was allocated for meetings, school group visits in the museum, and planned as well as spontaneous field trips—for example, to Adex, the design vendor’s operations center, and to Hueston Woods, to take photos for a deciduous forest exhibit. The first content review specified on the original project schedule was eventually conducted on an as-needed basis as I became more familiar with Don’s lessons and writing style. In the last two months, my work became more focused on web development, as I reached the stage for converting the Teaching Tools pages to PDF format for online access.
Chapter 3

Developing the Center Web Site

My major project was developing the Center for Environmental Education and Natural History (the Center) web site. The museum staff members directly involved in this project were Lisa Rosenberger, Michael Wright, and Cecilia Franz Berg. This chapter is organized according to the project schedule that I used (see copy in Appendix 1 on p. 43), starting with front-end analysis, through project planning; writing and editing content; and creating, testing, and documenting the web site.

Conducting the Front-End Analysis

My responsibility for developing the Center web site slowly evolved from two initial projects: revising the Hefner Zoology Museum and GREEN Teachers Institute sub-sites. Thus, my front-end analysis (Appendices 4 and 5 on pp. 46 and 47) was specifically geared towards these two sub-sites rather than the entire Center web site. However, these two sub-sites made up the bulk of the site, and when the scope of my project expanded to developing the entire Center web site, my initial work in planning the two sub-sites proved to be comprehensive enough for the entire web site. Further, other staff members had already worked on an initial site architecture that considered the Center’s organizational needs, contributing to the front end analysis.

In the front-end analysis, I first looked at the original web sites to gain a sense of the content and the style of writing. I then defined the audience for the web sites by looking at the museum’s mission statement and by interviewing the staff.

- The primary audience for the GTI web site is comprised of K-8 teachers and their supervisors.
- The primary audience for the HZM web site is comprised of museum visitors (University staff and students, researchers, area schools, and the general public).
- Secondary audiences for both web sites include funding organizations, award-giving bodies, and parents of K-12 students.
I next brainstormed possible questions that audiences might ask when they visit the web site. I worked with several K-8 teachers in a GREEN Teachers Institute summer workshop; and from class discussions and my interaction with the teachers, I learned of their concerns, foremost of which is how the Center’s resources could help them reach their curriculum requirements. I found that the secondary audience, particularly funding organizations, usually base their funding decisions on the success record and history of the Center’s programs—these could be highlighted in the web site. I also learned that museum visitors often go to a web site to obtain information on hours of operation, special events, and directions. I also considered possible donors seeking information on how they could support the museum and the Center.

After generating the audiences’ possible questions, I drafted a list of web pages for the HZM and GTI sub-sites that would address most of the questions. I gave Lisa a copy of this list and asked for confirmation on whether or not my analysis matched with the staff’s observations at the museum. Lisa approved the front-end analysis and the list of web pages, and I proceeded with creating a site map.

**Creating a Site Map**

I created a site map based on my findings in the front-end analysis and on the initial site architecture that the museum staff had previously developed. The site map (shown in Figure 3, next page) became my guide for writing content and setting consistent navigation throughout the web site. The site map begins with the portal page on the first level. On the second level are the links found on the portal page. The third level contains the three major sub-sites of the Center web site: the Hefner Zoology Museum, the GREEN Teachers Institute, and the Biosphere Project. A fourth level shows each of the sub-site’s pages, and the fifth level shows the various exhibits in the Virtual Tour, with each exhibit linked to a Teaching Tools page. A few of the exhibits are multi-part (for example, *Web of Life*), and the Teaching Tools are linked to these sub-parts rather than to the main pages of these exhibits.
Figure 3. Site map for the Center web site.
Developing a Project Plan

As the scope of my project expanded to the entire web site, Lisa assigned me to lead the project. I created a project plan that listed the tasks, the time needed to complete them, the due dates, and the persons responsible for each task (see plan in Appendix 1, p. 43). The bulk of the work went to editing and revising the GTI and HZM sub-sites and to implementing the new web interface on the entire site; the project scope did not include revising the Biosphere Project sub-site, although I incorporated the existing content into the new web template. Some of the activities, such as creating the user interface design concept and writing/editing the text for the GTI web pages, had already been completed or were ongoing at the time I drafted my plans. I set the target date for uploading the web site on April 6, 2004, to allow time for possible revisions before the end of my internship and to give me enough time to work on the Teaching Tools project.

I met with Mike and Lisa to finalize the project plan and assign roles. Mike was responsible for choosing the color scheme for the web site and designing the top banner of the web page template. From Mike’s design, I was to create a template in Dreamweaver based on Mike’s work and implement it on all web pages (except for the portal page). Mike and I worked collaboratively on the portal page. Lisa and Cecilia, on the other hand, were responsible for reviewing and editing the drafts.

Writing, Reviewing, and Revising

I drafted the content for the web pages in Microsoft Word, pictures and other graphic elements excluded. The first draft was reviewed by Cecilia, who made suggestions on wording and content. Lisa also edited some of the later drafts. After I revised the drafts, I placed the text in the Dreamweaver web page template. Lisa then copyedited the web page printouts. The following sub-sections describe a few of the web pages that went through this review cycle. I chose to discuss these pages based on how their content reveals the nature of the Center and its various audiences: teachers, visitors, and funding organizations.
GREEN Teachers Institute “Recognition and Accomplishments” Page

The GTI Recognition and Accomplishments page showcases the successes of GTI in terms of public recognition and participant accomplishments. Initially, I had planned the GTI Recognition and Accomplishments text to be in one page (see Appendix 16 on p.62 for the rough text draft.). This draft page was composed of the following sections:

- **National Recognition**
  I described the Education Award that the National Arbor Day Foundation gave the GTI.

- **Recognition From Local Educational Leaders**
  I used excerpts from comments educational leaders had written about GTI in their letters of support for our grant application to the Institute of Museum and Library Services (IMLS).

- **Accomplishments of GTI Participants**
  I included short descriptions of community-based projects GTI participant teachers had led with their students.

- **Testimonials on GTI Program Offerings**
  I included comments from evaluation sheets GTI participants had filled out.

For the last two sections listed above (Accomplishments and Testimonials), my original plan was to simply list the descriptive titles and link them to pop-up windows that contained the details. However, after Cecilia reviewed the initial draft, this plan changed. We determined specific sections to develop further, and Cecilia made suggestions on the writing style, for example, in the introductory sentences to testimonials. I incorporated the following suggestions into the final draft (see Appendix 17, p. 64):

- **Combine “National Recognition” and “Recognition From Local Educational Leaders” into “Recognition of GTI Programs”**
  Because the original content of the local recognition section was actually a testimonial, I moved this content into the Testimonials section. I then researched past grants and interviewed Lisa, the museum’s grantwriter, for details that helped me to write the recognition section. We included
information on competitive grants that the museum had obtained and used them as examples of how other organizations see the value in our programs.

- **Remove the introductions before each person’s testimonial and instead make a general introduction at the beginning of the testimonials section.**

  Cecilia suggested that I let the testimonials speak for themselves, simplifying and reducing the text.

- **Create a new page for the GTI participant accomplishments.**

  I made the “Participant Accomplishments” section into its own web page to make it more prominent. As a new page, it is included in the links on the left navigational bar. I wanted to make sure teachers who view the site see it and read about how GTI workshops can help them create innovative projects with their classes (see Appendix 18 on p. 65).

**GREEN Teachers Institute “History” page**

The history page is a testament to the success of the GTI. Both prospective participants and sponsors should be interested in GTI’s history and record of success. However, a long narrative format, we feared, would merely cause the reader to skim the page, so I opted for a more interactive format.

The primary source material for the history page was the grant application to the Institute of Museum and Library Services (see excerpt, Appendix 19 on p. 66), written by Lisa for one of GTI’s new workshops. From this document, I created a timeline that consisted of milestones for GTI. Lisa made a few editorial suggestions on the text draft for the web page before I finally adapted the text to the interactive web format. In the web format, users click on the milestones, represented by years. The historical information, with its accompanying graphic, then appears in the space below the timeline (see Appendix 20 on p. 67). The final web draft, as with the rest of the web pages, was copyedited by Lisa.
Hefner Zoology Museum “Visitor Information” Page

The visitor information page underwent several revisions, in part due to the complicated parking rules of the University. Appendix 21 (p. 68) shows one of the earlier text drafts for this page, which I ran through the Parking and Transportation Services Office at Miami for an accuracy check. However, Lisa, in her review, suggested that the parking information needed to be simplified further, giving priority to understandability from the readers’ point of view rather than to completeness. I also noted that some of the rules applied during times that the museum was closed, and thus these did not need to be included in the final draft. (See second paragraph of the first draft under “Parking Information,” Appendix 21 on p. 68, and the revised paragraph under “Parking,” Appendix 22 on p. 69.) In a later development, the museum director and the Parking Office reached an agreement that allowed Sunday museum visitors to park in the West Cook Field lot without a pass, and I revised the text to reflect this change (third paragraph under “Parking,” Appendix 22).

“Teaching Resources” and “Support the Museum” Pages

I include these last two pages as examples of pages in which it was especially important to consider the museum’s fundraising/fund recipient perspectives in writing the text.

The Teaching Resources page, shown in Appendix 23 (p. 70), originally listed only two activity kits: the skull and fossil kits. However, I later found out from Lisa that a grant written for the Museum Resources workshop specified, as one of the workshop’s outcomes, the creation of three “teaching packs” that would be made available to teachers as outreach materials. In addition to the skull and fossil kits, the materials to be created included a dichotomous key pack, which I added to complete the list on the Teaching Resources page. This addition was important so that our sponsors could see in concrete ways how the museum fulfilled its workshop objectives. However, we chose to retain the “kit” terminology instead of the term “pack” used in the grant, because teachers’ materials are generally distributed as “kits,” and we wanted this name recognition in our resources.
Finally, the last part of the “Support the Museum” page (Appendix 24, p. 71) uses the terms “reinvigorated” and “redesign” in lieu of “renovation” that was used in the original text. Grant making institutions, including the University, categorize their giving into project support, administrative support, capital funds, and others, and we wanted to avoid being automatically placed into the category of “renovation” until the reader learned more about the projects, which are much more than simple renovation. The words redesign and reinvigorate more accurately represent what the museum wants to do, and using these terms, we hope, will prevent doors to possible sources of funds from being closed at first reading.

**Conducting the User Test**

Due to time and resource constraints, the user test was conducted only internally, using the museum’s staff as participants. However, the staff covered a wide spectrum of user profiles, including undergraduate assistants, who used their Windows-based home computers (the museum is Mac-based), an elementary school teacher (one of our main target audiences), and the museum director, who also showed the site informally to several colleagues in education. The user test questionnaire was written by Lisa (Appendix 25, p. 72), and I presented the questionnaires to the staff and gave them a deadline for turning them in.

The user test report (Appendix 26, p. 73) summarizes the results of the user test. Aside from a few broken links and typographical errors, only a few changes were required. One significant change included the addition of “back to top” links on the GREEN Teachers Institute Workshops page (Appendix 27, p.74). A user had reported becoming confused by the anchor links on the top of the page that resulted in the page jumping down to the text indicated by the link. He had expected to be taken to a new page by the link. Thus, I added “back to top” links to make it clearer that the links were meant to go down the page.
Integrating the Teaching Tools Web Pages

As I worked on the Center web site, I also worked on editing and preparing the Teaching Tools (TT) for online access through the museum’s Virtual Tour. The Virtual Tour is accessible through the left navigational bar on the Hefner Zoology Museum sub-site. Each page on the Virtual Tour contains an image of the exhibit on the left and a text description on the right (see Figure 4). Below the image is a link that says “Click for Teaching Tools.” While the TT pages were being created, users who clicked on this link were led to a page that contained a “Teaching Tools under construction” notice.

I completed work on the TT pages two weeks after the Center web site was uploaded. I then redirected each exhibit’s “Teaching Tools” link to its specific TT page. Each TT page had a “Back to Virtual Tour” link that went back to the Virtual Tour exhibit from which it was accessed.

To increase visitor access and traffic to the TT pages, I added links to these pages in strategic locations throughout the Center web site. In the Teaching Resources page, I linked the activity kits to the TT pages containing lessons that use these kits. Also, I placed a link to the Virtual Tour home
page on the same page. As users visit each exhibit in the Virtual Tour, they could then access the TT pages individually.

After integrating the Teaching Tools in the Center web site, I performed a comprehensive link check throughout the Center web site to ensure that all links were working properly.

**Acquiring Copyright and Logo Permissions**

When I completed the web site, I also had to consider permissions for some of the material that I had used, including text and logos. Most of the materials in the TT pages were created in-house by Don Koller. However, some reference materials included a handout containing a map from the Ohio Department of Natural Resources, excerpts of Native American Myths from a book, and one handout from the University of Illinois Extension web site. As it turned out, the map and myth excerpts were already in the public domain, and thus we did not need permission; we just cited the original sources in our lesson plans as a courtesy to the publishers and to provide additional information to our web visitors. However, we were not given permission to include the University of Illinois handout in our lesson packet, so we (specifically, Don Koller) created our own handout in its place.

The logos I used on the Center web site were from those organizations that funded or recognized the Center’s programs. All of these organizations, ranging from government institutions such as the Ohio Environmental Education Fund, non-profits such as the Arbor Day Foundation, and corporations such as Cinergy, readily gave their permission when we contacted them via email. Several, such as Cinergy and the Institute of Museum and Library Services, provided electronic copies of their logos and specific guidelines for using them (for an example, visit Cinergy’s Standards page at [http://www.cinergy.com/standards/](http://www.cinergy.com/standards/)).
Writing the “Knowledge Transfer” Document

As a temporary employee, I was asked to write a “knowledge transfer” document about the work I had completed on the web site to serve as reference material for the permanent staff. This document will aid the permanent staff in maintaining and updating the site. We had planned for the entire web development team to have a hands-on session in which I demonstrated most of the aspects included in the knowledge transfer document. Unfortunately, time constraints prevented this session from happening within the internship period.

The knowledge transfer document consists of an introductory transmittal memo and the actual technical document, which I entitled *The Center for Environmental Education and Natural History Web Site: Technical Specifications* (see Appendix 28 for the memo and Table of Contents of the document). The memo includes a list of pages to update and suggests time intervals for updating. The main document has three major parts, a “Site Organization” section that includes the site map and describes how files are organized on the local and remote servers, a “Building the Site” section, which includes information on how I produced the Center and the Teaching Tools pages, and an “Updating the Site” section, in which I give step-by-step instructions for updating specific portions of the web site, including the site map, which uses an external JavaScript file.

Launching the Web Site

The Center web site was uploaded on March 31, 2004, for testing. After this date, I made a few revisions to the site based on user test results, and I corrected a few errors I noticed while browsing. Although the team considered the project complete shortly afterwards, the web site was not officially launched (that is, announced publicly—specifically to the Department of Zoology Faculty and other audiences) until August 2004.
This chapter reflects on various aspects of project management that I encountered during my internship at the Hefner Zoology Museum. As an introduction, I describe how I used Eric Verzuh’s definition of project management to create working project plans for my two major projects, the Center web site and the Teaching Tools pages. I then use his five factors for project management success to evaluate how well my project plans adhered to or deviated from these success factors. Lastly, I consider the role of the museum’s organizational structure and culture, as examined through Gareth Morgan’s brain metaphor, in developing and implementing these project plans.

Defining Project Management

To define project management, I must first define projects. Eric Verzuh defines projects as “work that happens one time only and has both a clear beginning and end” (Verzuh, 1999). This definition for projects is in contrast to that of ongoing operations, such as routine maintenance and other tasks that are done on a regular basis. Further, Verzuh adds that every project has a unique product, and that results may be tangible or intangible. During my internship at the Hefner Zoology Museum, I worked on both projects and ongoing museum operations.

During project management, the following phases or functions are usually observed (Verzuh, 1999):

- Project definition
- Project planning
- Project control

A clear project definition is essential in ensuring a project’s success. During project definition, the project manager determines the purpose, goals, and constraints of the project (Verzuh, 1999, p. 19).
The project manager also establishes roles and responsibilities for those involved with the project, as well as protocols for review and other communications needed by the project. Verzuh recommends that a written *project rules* be produced as a result of the project definition.

In the **project plan**, the project manager gives specifics on how to achieve the goals set out in the project definition. The following are some activities performed in creating the project plan:

- Defining tasks
- Inventorying resources
- Assigning work
- Scheduling deadlines
- Estimating cost

**Project control** activities keep the project moving towards the goal and includes progress checkpoints, progress reports, and corrective action—immediate responses to obstacles and other problems encountered.

As I developed the Center web site and the Teaching Tools web pages, I kept these project management principles in mind. Table 1 (next page) summarizes the different activities I performed in line with these principles. The project definition phase did not occur as one single, formal event before the actual projects started. Rather, the Center web development project and the Teaching Tools projects were gradually defined as I started working on small portions of each project and gained a clearer idea of what needed to be done. For example, my front-end analyses for the Hefner Zoology Museum and GREEN Teachers Institute web sites prepared me to create the project plan for the Center web site. Another example is that when working on the Teaching Tools lesson plan, I had initially thought that I would simply copyedit the lessons and place them into a web template. Upon starting work on one lesson plan, however, I quickly realized that the project scope needed to be expanded and redefined to include the following tasks:

- Defining styles for the lesson plans, both for the downloadable (PDF) printouts and the online pages.
• Changing the writing style of the lesson plans into an instructional rather than narrative form.
• Editing the handouts and linking them to the lesson plans.

These activities were needed to achieve the overall goal of creating an easily accessible resource for teachers. Thus, starting work on a small part of each project gave me enough insight to more clearly define the projects and to create project plans that solidified this definition.

Table 1. The project management cycle at the museum.

<table>
<thead>
<tr>
<th>Project Definition</th>
<th>Conducted informally, not written down, except for front-end analyses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project Plan</strong></td>
<td></td>
</tr>
<tr>
<td>Defining tasks</td>
<td>Created a task list based on my previous web development experience</td>
</tr>
<tr>
<td>Inventorying resources</td>
<td>Looked through current website, other written materials, inventoried available computing resources</td>
</tr>
<tr>
<td>Assigning work</td>
<td>Consulted with web development team and assigned tasks to museum staff</td>
</tr>
<tr>
<td>Scheduling deadline</td>
<td>Estimated time requirements, verified weekly schedule with staff (taking into account their other work responsibilities)</td>
</tr>
<tr>
<td>Estimating cost</td>
<td>Not done as part of project planning</td>
</tr>
<tr>
<td><strong>Project Control</strong></td>
<td>Used a checklist to indicate task status, submitted progress reports, reminded team members of pending drafts</td>
</tr>
</tbody>
</table>

The project plan phases in my two projects generally followed Verzuh’s description (see Table 1), except that cost estimates were not required. The only costs that the two projects demanded were new web development software and computer hardware (memory), which were purchased soon after I was hired and weeks before the actual start of the projects.
Project control activities were different in the Center web project and the Teaching Tools project. For the Center web project, I worked largely on my own and thus controlled my own pace. Project control in this project included two progress reports during the initial weeks of my project, submitted to Lisa, in addition to the progress reports required for this internship. Later, however, we ceased to follow formal checkpoints when it became evident that the project was going well and was without major problems.

For the Teaching Tools project, however, we needed a more structured project control mechanism due to the number of drafts (31 lesson plans and their corresponding handouts) as well as the number of people involved (Lisa, Don Koller, and me). Appendix 29 on p. 78 shows part of an MS Excel checklist that I used to keep track of the progress on each draft. The project followed a weekly schedule, and as each person completed his/her part, I indicated the person’s name and date on the appropriate cell. Some cells had notes for pending corrections and others had status information. The checklist also contained information on which exhibit in the Virtual Tour the Teaching Tools lesson should be linked to, as well as which other exhibits should cross-reference this lesson. These links sometimes changed as we evaluated the appropriateness of each lesson for each exhibit. These project control measures helped to ensure that the Teaching Tools project was on track and that we met the goal of creating an accessible, usable resource for teachers.

**Evaluating Against Project Management Success Factors**

Verzuh lists five project management factors essential to success (pp. 7-9):

- Agreement among the project team, customer, and management on the goals of the project
- A controlled scope
- A plan that shows an overall path and clear responsibilities, and will be used to measure progress during the project
- Constant, effective communication among everyone involved in the project
- Management support
These five factors are geared towards projects in a company setting; however, the principles also apply to an educational center such as the museum. Instead of the customer, the museum has diverse audiences; and with a small staff, there is an overlap between the project team and management.

**Agreement on Project Goals and Scope**

The project goals were very clear once we had determined what my two major projects for the internship were going to be:

- Reorganize the Center web site so that it is both usable and informative for our audiences.
- Edit and reformat the Teaching Tools pages for online access.

These overall goals guided the projects, with little deviation in terms of scope. Lisa and I agreed that the main focus for my revisions would be the GREEN Teachers Institute and Hefner Zoology Museum sub-sites, and although I ended up writing or editing a few other pages, the effect on the project plan was minimal. Lisa conscientiously ensured that I was not being overburdened in terms of time and effort.

**A Plan that Shows an Overall Path**

As shown in Appendices 1 and 2, the project plans I created were task-based and indicated the chronological order for completing them. The plan was more critical for the Teaching Tools Project, which had a more complicated formal review process and involved a non-writer on the team. Also, the volume of written work that the project included was quite large, and so the process had to be more carefully monitored not only to keep track of the drafts, but also to ensure that each lesson packet was complete before it was uploaded to the Internet.

Scope control was also built into the plan. Because all components of the projects had been specified early in the process, and because the team was mindful of the project targets and deadlines that we had to follow, the plan limited the amount of potential scope creep. The ultimate judge for whether or not to add a task to the list was Lisa who, with my input, decided on each task’s priority. For example, some of the Teaching Tools handouts for the lessons needed to be recreated in digital...
format or edited comprehensively. Lisa made recommendations for which ones to do first and which ones to set aside and go back to when lag time was available. She also delegated some of the work to student assistants, for example, contacting some companies for information about using their logos or linking to their site. Often, the delegated activities were those outside of the plan but ones that we later realized needed to be done.

**Constant, Effective Communication**

As is probably evident by now, constant communication was built into the project plan. We had scheduled checkpoints among team members for draft reviews. In addition, each of the project team members was easily accessible, either in person or via email. Our ‘customer,’ on the other hand—our virtual audience—was not consulted directly. My primary guide for audience appropriateness in my writing was Lisa, an experienced writer and education specialist, who has worked with the Museum’s audiences for several years.

**Management Support**

Management support was not an issue in my two projects. From the beginning of the project, when I specified the software and computer upgrades that I needed to complete the website, the permanent staff members at the museum trusted my judgment and gave me access to the tools, advice, and other support that I needed to complete the website and Teaching Tools projects. They were all mindful of the time that I spent on the projects and would make sure before they asked me to do any outside tasks that these tasks would not interfere with the main projects.

Thus the five success factors in project management were fulfilled in my two projects, which I planned according to the principles discussed in the previous section. For a project to be truly successful, however, a project manager should combine project management theory with an understanding of how the organization works. The following section examines organizational factors that affected the formation and execution of my project plans.
Applying the Project Plan to the Learning Organization

In his book, *Images of Organization*, Gareth Morgan (1997) uses metaphors to describe and analyze the way organizations are structured and how members within them communicate and achieve their goals. The brain metaphor is useful for describing the museum’s organizational structure and culture. In this section, I use this metaphor to describe how I made my project plans work within this “brain” context: either by including features in the plan that especially accommodated the museum’s characteristics, or by changing parts of the plan midway through the project in response to changes brought about by the nature of the museum.

The brain metaphor describes an organization that is flexible, resilient, self-organized, and that evolves with emerging challenges. There are three main characteristics of a brain organization. First, the brain organization acts as an information processing system, receiving, storing, and retrieving data for use by its members and constituents. Second, the brain organization is a learning organization: it has a capacity to scan for changes in the environment and take action accordingly, in order to maintain its existence and develop. Third, the brain organization has holographic properties: when broken, any single piece of a hologram can be used to reconstruct the entire image. That is, the essence of the entire organization is found within each part, much like DNA is found in all cells of the body, containing all of the genetic information needed to produce the entire organism (Morgan, 1997). The museum has all three characteristics, and the following is a discussion of their implications for project management.

The Museum as an Information-Processing System

An information-processing system such as an Internet search engine examines the information entered, interprets it, and makes decisions based on the processed information (Morgan, 1997). In many situations, there may be a preplanned response for events that frequently occur. For example, when a person searches a term on Google, the search engine processes the term, checks its database, and provides search results. If the user has misspelled a word, Google will ask if he or she meant to
enter the closest word in its dictionary. In the same simplified way, the museum staff processes
information from diverse sources—scientists, teachers, sponsors, the general public—and decides on
a proper response, whether it is to store a newfound specimen, to create a new teaching resource, to
write a progress report or a new grant, or to open for extended hours on a weekend.

Where does the intern fit into this information processing system? I was included in many of
the decision-making processes at the museum. Like Google, which passes the information various
websites have through filters in order to give the proper response to a search term, the museum staff
processes outside information, and the relevant topics make their way into different meetings—those
meetings that I attended would have topics in which I could participate in making and executing
decisions.

The project plan, then, had to accommodate the outcomes of such decision-making processes.
In contrast to a mechanistic plan that has a predefined response to everything (as machines in an
assembly plant), the project plans had to be adaptable, because the museum encountered new
situations all the time. The project plans had to maintain some fluidity in the schedule in cases where
new demands on the team members arose. For example, when new school group visits were
requested, certain project team members became unavailable for reviewing drafts. The rest of the
team then needed to work on other museum duties while the project was on hold, or work on other
parts of the project that did not require the participation of the unavailable team members. If the plan
was not fluid, we would have been left with a gap in which someone could not continue working
because of a missing team member.

It is interesting to observe that as part of a greater information processing system (the
museum), the project plan also reflected the characteristics of a mini-information processing system.
This aspect of the brain metaphor is most easily seen in the Teaching Tools project. Don Koller’s
information came in, it went through the first filter (my editing), then through Don’s subject matter
expert filter, back through me (the revision filter), through Lisa (copyediting and museum policy and
style filter), and then to Don for a final check before the final decision to upload the files to the site
was made. This information-processing characteristic in the project plan perhaps makes it especially suitable in the museum—a process compatible with the larger whole, calling to mind the holographic property discussed later in this chapter.

The Museum as a Learning Organization

A second aspect of the brain metaphor used to describe organizations is the ability to learn from the environment, ensuring survival. A learning organization:

- Scans the environment and anticipates change
- Develops an ability to question, challenge, and change operating norms and assumptions
- Allows an appropriate strategic direction and pattern of organization to emerge (Morgan, 1997)

As a learning organization, the museum staff continually reevaluates their activities in the context of the museum’s position in the University and in a greater sense, the Ohio educational system. This evaluation is conducted in an effort to sustain the museum by improving the museum’s services, increasing autonomy in its operations, and expanding its capacities through larger galleries and greater physical and material resources. The museum is supported by private funds and funds from the University, and the museum’s survival is largely ensured by being responsive to the opportunities and responsibilities the museum has as a grant recipient.

Of my two projects, the Center web site project needed to have this environmental scanning mode. Because the web site has many audiences, as I developed web pages I realized that I needed to look carefully at the external factors that affected the museum. These factors, in turn, controlled what topics I could address, what language to use, which organizations to link to, and what importance to give to the various organizations that are associated with the museum. The web site had to cater to everyone without offending any one group. This decision-making process was not explicit in the project plan, but occurred as I executed the tasks in the plan—which is appropriate for a learning system, one that responds to environmental factors in real-time.
The museum’s ability to question, challenge, and change operating norms and assumptions in order to strategically meet its organizational goals is exemplified in its response to various visiting school groups. While in general, the museum tends to accept most requests for accommodations during field trips, such as special lectures or activities, there are instances when this norm must be broken. For example, when the request was made in too little time to prepare a worthwhile activity that students could benefit from, when the museum staff would rather work on other pressing matters, or even when the museum had had a previous unpleasant experience with the group that made the request, we did not accommodate the request. These acts of self-preservation served to improve the overall running of the museum, preserving the staff’s resources for tasks that would bear more fruit.

In the same way, my project plans had to be continually re-examined to see whether I was spending my efforts where they would most be productive. Thus when it became evident that part of the revision process in the Teaching Tools project had become redundant and was no longer needed, the operating plan was modified. On the Center web site project, pages that would not be as frequently visited by audiences but required more technical effort (for example, a collapsible site map tree) were relegated to a lower priority.

The Museum as a Holographic Brain

The last aspect of the brain metaphor is the brain’s holographic design. A hologram is a photographic plate in which image information is encoded using lasers such that if the hologram is broken, any single piece of the plate can be used to recreate the entire image. This property of the brain, the encoding of the whole in its parts, was revealed in studies where the brain was shown to reorganize itself when specific parts were removed or injured, such as when young children who lost a complete hemisphere of their brain recovered their lost functions when the remaining hemisphere took over. A related property is the existence of redundancy—when a part fails or disappears, another part can perform its function. There is also requisite variety, so that specialized parts of the brain can deal with the challenges posed by the environment. Lastly, it has the property of minimum critical
specification—a measure of autonomy that allows individual parts of the brain to evolve or develop, while maintaining a minimum of core function and properties (Morgan, 1997).

The museum also possesses these holographic properties. Each staff member of the museum has the “whole encoded into parts:” they all embody the museum’s mission and values in their work and even in their lifestyles: each one is a naturalist at heart, sharing a love for nature, respect for all living things, and a passion for learning. There is also a good level of redundancy in the staff members’ functions, so that when one is unavailable to teach a lesson, another can take his or her place; when one is swamped with too many grant proposals, another can shoulder other writing responsibilities. All staff members can give tours and lead school group activities, although each has his or her own area of specialization in running the museum. Depending on the need, staff members can form cross-functional teams to work on projects or perform a vital museum function on their own. Lastly, the museum is characterized by minimum critical specification—each staff member has his or her targets, goals, and responsibilities, but each is generally trusted to create his or her own methods for accomplishing the work that needs to be done.

As an intern, I was given a taste of being part of this brain-like organization. Having grown up in a city, I was not a natural naturalist, although I did possess a good level of curiosity about biology and living things. Part of being effective in my projects, especially in writing the Center web site, was internalizing the museum’s mission and values. I achieved this appreciation through flower walks and hiking in the snow as much as through the formal techniques I learned in MTSC, such as conducting an audience analysis. Although these activities were not part of the project plan, the time I spent on them was well spent, and the flexibility of the project plan allowed such beneficial activities to occur.

Not only was the museum “encoded” in me, as a part of the museum, I also had to be integrated into the museum. One of the last pieces I wrote, which I took into account in creating the project plan, facilitated this integration: the “knowledge transfer” document enabled other staff members to know about my functions and, I hope, to perform these after my internship ended. Of the
museum staff, the more technically savvy would specialize in the knowledge transferred, but the document ensures that everyone who might need the information has access to it.

The last property of minimum critical specification is exemplified by the fact that I developed the two project plans largely on my own. Like other museum staff members, I was given goals, some tools to work with, and autonomy to decide what methods to use in accomplishing the goals. The project plans themselves, in keeping with this property of the larger organization, have minimal specs built-in: I assigned tasks and deadlines, with not much specific instruction on how to go about completing these tasks. Members of the project team already had their own work processes, and they were qualified and experienced in the tasks assigned to them. Working in this environment, being regarded as an equal, helped me to achieve my full potential as an intern. Although I sometimes felt wary of the decisions I was allowed to make, the experience pushed me to grow and to be confident about my skills and abilities.

**Concluding Thoughts**

My internship at the Hefner Zoology Museum provided me with a comprehensive look at how an organization focused on science and environmental education is run. It was interesting to observe how a small staff of four permanent members and a few other specialized workers completed projects that make an impact on environmental and science education in Southwest Ohio and the surrounding regions. Different people come and go, contributing to the work of the Center, but each person’s work is lasting and important. Project management and technical writing were interwoven in all these projects, and the writing staff took a lot of care to ensure a uniform voice and style for the Center, at the same time allowing the richness of everyone’s contributions to show. My internship at the museum truly was and will continue to be a rewarding learning experience.
References


<table>
<thead>
<tr>
<th>Web Site Development Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tasks</strong></td>
</tr>
<tr>
<td>1. Site Architecture</td>
</tr>
<tr>
<td>Establish File Structure</td>
</tr>
<tr>
<td>Design User Interface</td>
</tr>
<tr>
<td>2. Art</td>
</tr>
<tr>
<td>Choose Fonts</td>
</tr>
<tr>
<td>Establish Color Scheme</td>
</tr>
<tr>
<td>Create Banner</td>
</tr>
<tr>
<td>Design Buttons</td>
</tr>
<tr>
<td>Create Template Page</td>
</tr>
<tr>
<td>Design Portal Page</td>
</tr>
<tr>
<td>3. Create Text and Graphics</td>
</tr>
<tr>
<td>GTI Front End Analysis</td>
</tr>
<tr>
<td>GTI Text</td>
</tr>
<tr>
<td>Heifner Front End Analysis</td>
</tr>
<tr>
<td>Heifner Text</td>
</tr>
<tr>
<td>4. Review Text</td>
</tr>
<tr>
<td>GTI Text</td>
</tr>
<tr>
<td>Heifner Text</td>
</tr>
<tr>
<td>5. Revise Text</td>
</tr>
<tr>
<td>6. Build the Site</td>
</tr>
<tr>
<td>7. Test and Evaluate</td>
</tr>
<tr>
<td>Create Test Questionnaire</td>
</tr>
<tr>
<td>Test Web site</td>
</tr>
<tr>
<td>8. Revise the Site</td>
</tr>
<tr>
<td>9. Pre-Launch Check</td>
</tr>
<tr>
<td>10. Web Launch</td>
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<tr>
<td>11. Documentation and Knowledge Transfer</td>
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<tr>
<td>Info session</td>
</tr>
<tr>
<td>Teaching Tools--Editing and Web Access Project (13 weeks total)</td>
</tr>
<tr>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Tasks</strong></td>
</tr>
<tr>
<td>1. Collect activities</td>
</tr>
<tr>
<td>2. Design general document structure</td>
</tr>
<tr>
<td>3. Review document structure</td>
</tr>
<tr>
<td>4. Finalize document structure</td>
</tr>
<tr>
<td>5. Implement document structure and first substantive edit</td>
</tr>
<tr>
<td>6. SME review for content</td>
</tr>
<tr>
<td>7. Copy edit</td>
</tr>
<tr>
<td>8. Approve final activity page</td>
</tr>
<tr>
<td>9. Produce PDF and test links</td>
</tr>
<tr>
<td>10. Create web pages</td>
</tr>
<tr>
<td>11. Web Site review</td>
</tr>
<tr>
<td>12. Final edits and pre-launch checks</td>
</tr>
<tr>
<td>13. Web launch</td>
</tr>
</tbody>
</table>
Welcome to the Center for Environmental Education and Natural History at Miami University (Oxford, Ohio). This site serves as a central location for online information about environmental projects and organizations throughout the State of Ohio. To find out more about any of these programs, please click on the icons below.

- Hefner Zoology Museum
- GREEN Teachers Institute and Workshop Applications
- EEOhio
- Science for Ohio
- Center Programs and Activities
- Biosphere 2000 Project

Site Map

You are visitor number: 496
Appendix 4
Front-End Analysis of the GTI Web Site

Front-End Analysis for the GREEN Teachers Institute (GTI) Web Site

This document identifies several points to be considered in planning the new GTI Web Site. These include the current web site, the target audience, and a preliminary list of web pages for the site.

Current Web Site
Currently, two pages exist about the GTI on the Center for Environmental Education and Natural History web site:

- The **Main Page** contains information about the staff, which needs to be updated. The first paragraph does not introduce nor describe the GTI program.
- The **Workshop Applications** page contain a list of links to PDFs of the application forms for each workshop offered, and contact information for Mike Wright. The page does not contain descriptions/dates for the workshops nor application deadlines.

Audience
The primary audience for the GTI web site is K-8 teachers and their supervisors. Secondary audiences include accreditation boards, award-giving bodies, funding organizations, and parents. The following is a list of questions that the audience may want to see answered in the web site:

- What is the GREEN Teachers Institute?
- Who is behind the GREEN Teachers Institute?
- What are GTI's component programs/workshops?
- How can teachers join these workshops?
- How will GTI support/fit in with teachers’ curricula and local/national standards for science and environmental education?
- How has the GTI evolved?
- What do others say about GTI? (memberships/accreditations, awards, and testimonials)
- Who sponsors/funds GTI programs?

Preliminary Pages
Below is a list of preliminary pages along with their proposed content.

<table>
<thead>
<tr>
<th>Home Page</th>
<th>Welcome message, description of GTI, link to Hefner Zoology Museum (HZM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshops</td>
<td>Workshop descriptions, application dates, and links to application materials (This page will need to be periodically updated)</td>
</tr>
<tr>
<td>Curriculum Connections</td>
<td>Topics covered in the workshop and how they relate to educational/curriculum standards</td>
</tr>
<tr>
<td>Staff</td>
<td>Staff descriptions, short blurb about and link to HZM</td>
</tr>
<tr>
<td>History</td>
<td>History of the GTI</td>
</tr>
<tr>
<td>Sponsors</td>
<td>Funding organizations that support GTI</td>
</tr>
<tr>
<td>Recognition</td>
<td>Awards, memberships, teacher testimonials, and accreditations</td>
</tr>
</tbody>
</table>
Appendix 5

Front-End Analysis of the HZM Web Site

Front-End Analysis for the Hefner Zoology Museum (HZM) Web Site

This document identifies several points to be considered in planning the new Hefner Zoology Museum (HZM) Web Site. These include the current web site, the target audience, and a preliminary list of web pages for the site.

Current Web Site

Currently, the HZM has four sections/pages:

- The welcome page contains information about the museum’s location and regional focus. It also invites site visitors to click on the links to learn more about HZM.
- The mission page states HZM’s mission and focus on environmental education.
- The constituents page contains lists HZM’s audiences and connections with those who conduct its supported research.
- The virtual tour section is new and opens in a separate window from the HZM’s home pages. It is a self-standing subsite of the HZM web site.

Audience

The audiences for the HZM web site are its constituencies, which include museum visitors, teachers, and researchers. The following is a list of questions that the audience may want to see answered in the web site:

- What is the Hefner Zoology Museum?
- What kinds of exhibits does HZM have?
- Are there going to be new exhibits when I go?
- How do we get to the zoology museum?
- Is there parking?
- Who runs the museum?
- Who supports the museum?
- If I want to bring students to the museum, who should I contact?
- What are the museum’s hours? Are they open on holidays? Summer hours?
- What museum programs can I participate in?

Proposed Pages

The existing four sections will be retained and adapted into the new design scheme being developed. The existing text will be used and edited as needed. In addition, the following pages will be added:

<table>
<thead>
<tr>
<th>Museum News</th>
<th>Projects under development, such as the Imaginarium; events and special exhibits. This page will need to be updated for events and special exhibits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support the Museum</td>
<td>Information about supporting the museum through donations, sponsorships, endowments, and Friends of the Museum.</td>
</tr>
<tr>
<td>Special Programs</td>
<td>Nature walks (?). Science Alliance. (Anything else?).</td>
</tr>
<tr>
<td>Visitor Information</td>
<td>Hours, address and phone number, map to the museum.</td>
</tr>
</tbody>
</table>
Appendix 6
New Center Portal Page

Environmental Education for Ohio
Your Portal to Statewide Environmental Education Resources

Center Home Page
Hefner Zoology Museum
GREEN Teachers Institute
Biosphere Project
Center Events and Activities

Science for Ohio  EEOhio  Costa Rica

This portal is hosted by the Center for Environmental Education and Natural History at Miami University (the Center). To go back to this portal from any of The Center’s web pages, please click on the following icon:

Click here to view the site map.

You are visitor number:

12230
Appendix 7

New Center Homepage

Welcome!

Located on the Oxford (Ohio) Campus of Miami University, the Center for Environmental Education and Natural History (the Center) is a comprehensive resource for diverse audiences. The Center enables students, teachers, naturalists, and other Ohioans to enhance their understanding of, and appreciation for, animal biodiversity, conservation, and ecology.

The Hefner Zoology Museum, GREEN Teachers Institute, and Biosphere Project are the core components of the Center; all environmental education and natural history endeavors—including museum-based activities, outreach programs and curricular materials—are designed, produced, and conducted through these components.

Please click on the tabs above to learn more about the Center.

We thank Corinthia Que for expertly designing and constructing the Center’s new web site. We also thank Collin Dawson for devising the new site’s initial concept and Tim Chilcote for maintaining our original site.
Welcome to the Hefner Zoology Museum

Located on the Oxford (Ohio) Campus of Miami University, the Hefner Zoology Museum seeks to enhance visitors' understanding of animal natural history.

Geographically, the museum emphasizes the Southwest Ohio region, but it also explores relevant national and international issues and topics.

Please click on the links at the left to find out more about the museum, its programs, and its staff.
Appendix 9
Sample Original Lesson Plan

Title: You are eggactly right!

Grade level: 3-8

Theme: Egg adaptation to nesting site

State Indicators: 3L5-2

Materials needed: 5 different eggs or replicas; chicken, chicken hard boiled, owl, shore bird, penguin and a straw. The eggs are blown except for the chicken eggs.

Teacher background: See attached

Key Words: incubate, adaptation, elliptical, nest sites

Lesson: The students are broken into 5 or 6 equal groups; there should be about 5 per side. They are to arrange themselves on opposite sides of the room, each with a straw. Explain to the participants they are parent birds and they need to rotate their eggs, while not damaging them. They may only use their straw (beak) to move the eggs. The students are to be on their hands and knees. They must roll their egg across the floor to the other teammate and he/she in turn will roll their egg back. When the last egg crosses (if it does) the finish line they are the winner. There will be a difference in the way the eggs roll. The eggs should be raced in the following order: hard boiled chicken, chicken, owl, song bird and the shore bird. You will want to place a 10 minute time limit on the race.

Discuss with the class why the eggs rolled the way they did and why there are differences in the shape of the eggs. Have a student look up the habitats of the various birds to help.

Chicken hard boiled: rolled easy and straight...nothing was moving inside since it was boiled
Chicken: it wobbled because the inside tried to stay upright for the embryo. It rolled fairly straight as a chicken is a ground nester an the need to stay close is not so important
Owl: very round egg that rolled straight, it is a cavity nester and the egg cannot roll away
Penguin: small and harder to control, some what oval and wanted to make a large circle
But since it would be in a nest it would not “get away”

Shore bird: This egg is definitely elongated and rolls in a circle. WHY?? These birds nest along water or cliffs and on a rather weakly made stone nest. The eggs could roll away with disastrous consequences. So they are formed to roll in circles.

Optional activities:

Literature connections:

Short descriptions of animals that hatch from eggs. Clues are given and the students guess what animal it is.

Website:
www.naturesmart.com/columns/09_
Appendix 10

Style Guide for Teaching Tools Exhibits

The following is a style guide for the Teaching Tools lesson plans that are accessible from the museum’s Virtual Tour.

Source Files
The activity pages were written in MS Word and then converted to PDF format using Acrobat. An MS word template, Teaching Tools Activity dot, is on the white IBM. To create a new Teaching Tools lesson plan in MS Word, click File ➔ Project Gallery ➔ My Templates and select the template file. Instructions for converting the completed MS Word document into PDF format are in the document, The Center for Environmental Education and Natural History Web Site. Technical Specifications.

Page Layout
Upon opening the template file, you will see the first page, which has a title placeholder, “Activity Title,” and a table with two columns; the left column for major headings and the right column for body text. The second and subsequent pages have a header that contains the page number and the activity title. The template file is programmed so that the title you type in place of the title placeholder in the first page will automatically be included in the header for the next pages upon closing or printing the document. Page margins are 1” from the edge.

Fonts
The main fonts are Textile for title and headings (as in this document) and Times New Roman (11 pts) for text. The Textile font is eye-catching and its non-rigid structure is consistent with the exploratory nature of the inquiry activities. The title is in 16 pts Title Caps and the section headings are in 12 pts Title Caps. In the template, the cell to the right of the Materials Needed section might be divided into two to three equal parts to facilitate entry of materials in a list format (without bullets). The first letter of each item in the materials section is capitalized. There is also a 0.18” hanging indent for the second and subsequent lines to further distinguish the start of each entry. The following are the styles set in the MS Word template:

Activitybody: Times New Roman 11 pts, Left-aligned
Activityheading: Textile 12 pts, Left-Aligned
ActivityTitle: Textile 16 pts, Centered

Within the Lesson and Optional Activities sections, there may be a further level of subdivision. The headings for such sub-levels are in Textile 10 pts, left-aligned. Lastly, the second- and subsequent-page headers will be in Arial 10, with the activity title in italics.

All bulleted and ordered lists (used particularly in the Lesson section) are flush-left with the cell margin, with a hanging indent of 0.25” and Arabic numerals are used for the first level steps in the directions, while lowercase alphabet characters are used for the second-level steps (sub-steps). Second-level bulleted and ordered lists are indented 0.25” with an additional hanging indent of 0.25” (see example on the next page).

1. This is the first level.
   - This is a bulleted list within a step.
   - This is a bulleted list within a step.

2. This is another first level.
   a. This is an ordered list at the second level (a sub-step).
      - This is a bulleted list within a sub-step.
      - This is a bulleted list within a sub-step.
   b. There is a 6-pt paragraph spacing between steps.

Line and Paragraph Spacing
The body text is single-spaced. Each section is separated by a single, 12-pt row. To align the body text with the larger headings, the first paragraph in each section should have a paragraph spacing of 2 pts before (Format ➔ Paragraph ➔ Spacing). In the Lesson section, the ordered list of directions (in Arabic numerals) have a paragraph spacing of 6 pts between paragraphs. Bulleted lists in each step are single-spaced, while sub-steps have a paragraph spacing of 6 pts (see previous example). Finally, the Literature Connections and Web References entries are single-spaced with a paragraph spacing of 6 pts. Literature Connections citations use the APA style, but the Web References section just lists the title of the web page and the URL (see examples below).

Literature Connections


Web References
Division of Geological Survey Home Page
http://www.geosurvey.gov

“Using Fossils”
https://psu.indiana.edu/geo/paleo/fossils.html
## Appendix 11

**Template for Teaching Tools Exhibits**

<table>
<thead>
<tr>
<th>Activity Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Level</td>
</tr>
<tr>
<td>Theme</td>
</tr>
<tr>
<td>State</td>
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<tr>
<td>Indicators</td>
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<tr>
<td>Materials</td>
</tr>
<tr>
<td>Needed</td>
</tr>
<tr>
<td>Teacher</td>
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<tr>
<td>Background</td>
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<td>Key Words</td>
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<td>Lesson</td>
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<tr>
<td>Optional</td>
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<td>Activities</td>
</tr>
<tr>
<td>Literature</td>
</tr>
<tr>
<td>Connections</td>
</tr>
<tr>
<td>Web References</td>
</tr>
</tbody>
</table>
Appendix 12
Sample Teaching Tools Page

Teaching Tools

What's In A Name?: Classifying Organisms and Animal Phylogenetic Tree

The three lessons on this page expand the concepts in two of the museum's exhibits, What's In A Name?: Classifying Organisms and Animal Phylogenetic Tree.

Groupings
This lesson helps younger students to group items according to observable characteristics.

Use and Construction of a Dichotomous Key
Students use a dichotomous key to identify plastic models of lizards.

Dichotomous Key: Skulls
This lesson combines the use of dichotomous keys with the observation of characteristics of predator and prey skulls.

Please see the Modifying Our Home: Organisms and the Environment Teaching Tools page for related activities.

Groupings

Grade Level
K-3

Theme
Grouping of items according to similar characteristics

Activity Description
This lesson includes two activities that use plastic insects. The first activity asks students to observe specified characteristics and group the insects accordingly, ultimately ending up with very similar insects in the last group. The second activity asks students to decide which characteristics they would use to group their insects.

Materials Needed
- One insect pack per group of 2-3 students, each pack containing the same mix of 8 different plastic insects*
- Paper marked into four sections
- One new insect per group (For Insect Grouping II)

*Insects can be bought at www.ustoy.com or borrowed from the Hefner Zoology Museum.

Teacher's Guide
Groupings.pdf PDF files require Acrobat Reader.

---

Use and Construction of a Dichotomous Key

Grade Level
3-6

(continued on next page)
Theme
Classification, use and construction of dichotomous keys

Activity Description
This lesson includes two activities. In the first activity, students use a dichotomous key to identify plastic lizards. In the second activity, students create a dichotomous key based on the characteristics of the lizards. An example with instructions for making a key is included in the materials listed below. To enrich the lesson, Johnny’s Wise Use of A Dichotomous Key, an original story, may be read to the class.

Materials Needed
Per group:
- 6 plastic lizards
- Lizard Dichotomous Key
- Field Guide to Plastic Lizards
- Paper
- Pencils

Optional (see Teacher’s Guide):
- Johnny’s Wise Use of A Dichotomous Key
- Field Guide to Plastic Lizards

*Lizards can be bought at www.usotv.com or borrowed from the Hefner Zoology Museum.

Teacher’s Guide
Use and Construction of a Dichotomous Key.pdf
PDF files require Acrobat Reader.

Download the entire teaching packet: Use and Construction of a Dichotomous Key.zip

Dichotomous Key: Skulls
back to top

Grade Level 5-8
Theme Use of dichotomous keys
Activity Description Students use a dichotomous key to identify skulls of mammals commonly found in Ohio. Students also observe characteristics that can help them discern the animals’ eating habits.

Materials Needed
- We Can Tell What Animals Eat by Looking at Their Teeth by Chris Botrus
- Mammal skulls* (or pictures of them)
- Skull key
* Skull kits can be borrowed from the Hefner Zoology Museum.

Teacher’s Guide
Dichotomous Key: Skulls.pdf
PDF files require Acrobat Reader.

Download entire teaching packet: Dichotomous Key: Skulls.zip
The Bird's Nest Corner

The Bird's Nest Corner will serve as a reading and picture-taking corner. The nest will be partially painted on the wall and partially (around 1/4 of its protruding). The protruding section is made of double soft material, which will be easy to clinch into one which will be large enough to seat two children and one adult. If possible, the nest will be activated to play the bird call once (not continuously) when someone sits on the nest. The bottom of the nest contains a cave for books or for storing activity materials. The bird's nest is based on the nest of the wood thrush set in a beech tree. A detailed description or the nest follows: measurements indicate actual nest size from which the proportions for the large-scale exhibit can be extrapolated.

General Information

The wood thrush inhabits a wide variety of trees and feeds mainly in the forks of horizontal branches or in a crotch, where there is ample shade. Breeding season starts in spring and is accompanied by males' song, which last until the end of July. Each nest has 2-4 eggs. In the model, these eggs, some of which may have hatched, will be painted on the wall or on the panels to add dimension. For safety and maintenance purposes, the base of any panels to be used for this exhibit should be attached securely to the floor (i.e., not hanging from the ceiling from which it can fall).

Nest Composition

The wood thrush nest is a firm, compact open cup made of the following materials (see reference photo on the next page; birdnest.jpg in the CD*):

- Grasses
- Dried leaves
- Moss
- Paper
- Leaves
- Mud
- Roots
- Twigs
- Dead leaves
- In the foundation

The nest has the following dimensions:

- Outside diameter: 10.2 cm - 14.0 cm
- Inside diameter: 7.6 cm - 9.3 cm
- Depth: 3.2 cm - 5.1 cm

* Although the reference photo shows a conspicuous tree, beech tree will be used for the exhibit.

Egg Characteristics

Eggs are a blue or bluish green, oval-shaped, and smooth with a slight gloss. The average size is 25.5 mm x 18.6 mm.

Photos

Below is the reference photograph for the wood thrush nest, taken from Eastern Birds' Nest (see reference section). The CD contains another illustration of this nest (NestDrawing.jpg), which shows the leaf structure or the nest, as well as an illustration of the nest set in a beech tree (beechtree.jpg).

References


The Beehive Model

The beehive model shows children the social organization of bees: the different types of bees found in the hive (including those in the early stages of development), and how the entrance of the hive allows large numbers of bees to live together in a way that is efficient and that benefits the group. This exhibit connects with the rest of the prime section of the Imaginaria, facilitating discussions about the interdependence of bees and flowers, the lifecycle and adaptation to weather. The following section provides some technical specifications for the model as well as some background information that can be used for designing and constructing the beehive.

Technical Specifications

Beehives in temperate regions prefer to build their hives inside tree cavities (for example, maple trees). The exhibits will have the form of a single, hollowed-out tree trunk that can be opened to reveal the combs inside (hanging from the top). The trunk can be opened on both sides and will have neat fiberglass panels that protect the combs (see figure below). Caged bees represent the door (viewing panel) on the other side and a hinged fiberglass top. The exhibit will be an apidostat with a roller (or mode) comb and hives that children can handle and examine with hand lenses, etc.

Schematic of the Beehive Model

The model can have 3-4 combs, but only those on the outer ones need to be detailed, showing bee activities and brood development as discussed in further detail in the next sections.

There will be a small opening near the bottom of the tree trunk (below the comb) where the bottom of the comb is, around 60-70 cm², representing the entrance. This opening will facilitate discussions about young worker bees that guard the entrance and stimulate curiosity in viewers as they are allowed to peep through the hole (possibly while turning a button that turns on a light inside before opening the tree trunk).

The following sections provide a background on beehive structure and the different types of bees in a colony. They also refer to attachments that contain reference photographs and diagrams.

Beehive Structure

The beehive has a usual arrangement of cells containing the following (see Attachment 1; color slides in the CE. Beehive form):
- Honey storage, near the top where the combs are attached, there is more support for their weight in transportation.
- Pollen storage, typically below the honey storage.
- Brood nest, occupying the area below the pollen storage until the bottom of the hive.
- Drone comb, a small area on the bottom corners of the beehive.

Additionally, the queen cell (elongated peanut-shaped box) can be found hanging from the bottom of the comb wherever it is time for a new queen to be reared. For purposes of the model, 2-3 queen cells on each side will suffice. Furthermore, drone cells are slightly larger than the rest of the cells in the beehive (see Attachment 2).

Honeybees build a parallel arrangement of regularly shaped combs. Combs consist of two backs-to-back layers of horizontal hexagonal cells built vertically from the top of the hive. Cells become darker as they age, so that the inner walls of the cell are white (see photos in slides).

Each cell is slightly tilted upwards to prevent honey from running out (see detail, Attachment 3). Although the size of each cell varies depending on age and frequency, the average diameter (will-to-waist) is 5.37 mm in worker cells and 6.29 mm in drone cells.

Honeybees are divided into three castes: the queen, drones, and workers. The queen is the only female whose size is twice that of a worker (which is about 50%). Drones are approximately the same size as queens, with their abdomens being blackened where the queen’s is pointed (see diagrams, Attachment 4).

Attachment 5 shows the stages of development of each caste. A queen lays a single-shape egg of about 1.6 mm in length, and these develop into the three castes depending on fertilization (drones are unfertilized) and the food they receive. At several stages in development, the cells are capped. When a bee is ready to be used, it eats this cap off.

Typical Summer Scene

Attachment 6 also shows the activities bees engage in during summer, which will be shown in the model.
• Storing honey and pollen
• Collecting and making honey from nectar
• Attending to the queen
• Building the comb
• Driving out "useless" drones

In addition, the figure shows an entrance of a queen cell where a new queen is almost ready to emerge. The scene also shows developing workers and drones. As can be seen in Attachment 5, the cells are closed at various stages of development.

Assorted Pictures
The following pictures are also attached for further information: please see the PowerPoint file (beehive pictures.ppt) in the enclosed CD to see them in full color.
• An actual beehive, showing four combs
• Cross-section of a comb, showing developing larvae
• Close-up view of cell containing eggs and newly developed bees
• The three bee types, showing relative size (the worker bee is about 0.5" long)
• Close-up view of honeycomb, showing honey cells and bees in various stages of development
• Queen larva, size is approx. 1" from head to tail

References
Pictures, illustrations, and information were taken from the following:


Appendix 15

Center One-Pagers

The Center for Environmental Education and Natural History

Project

The Center for Environmental Education and Natural History (the Center) at Miami University is a comprehensive learning facility for diverse audiences, including preK-12 students and teachers, the university community, and the general public. With resources ranging from vibrant museum galleries to award-winning science-based workshops, the Center strives to provide meaningful environmental education and natural history experiences. The following comprise the Center:

- Hefner Zoology Museum, Imaginarium, Paul Daniel Classroom, and other physical spaces
- GREEN Teachers Institute, a series of professional development workshops for K-12 teachers
- Biosphere Project, a collection of environmental science publications
- Online resources, accessible through www.EnvironmentalEducationOhio.org
- Educational programming, including museum docent tours, outreach activities, and other educational materials
- Conservation projects, including Tashayam, an international partnership dedicated to enhancing environmental education and conservation in the United States and Costa Rica

Goal

To ensure the Center’s perpetual existence as a resource for environmental education and natural history

Need

$2 million in endowment funds over 4 years ($500,000/year)

Benefits

By joining our effort to design and conduct projects of local, regional and international significance, you will receive several benefits, including the following:

- Naming of the Center after your company or designated honoree
- Increased company or product recognition among our audiences
- Access to our audiences through logo placements and links on our web site
- Enhanced company identity as an active partner in environmental education and a supporter of Miami University
The Imaginarium: Where Imaginations Soar and Dreams Take Flight

Project
With your support, we will be able to build the Imaginarium, a discovery center for children ages 3-8 designed to nurture their innate sense of wonder about animals and nature. This center also will provide teachers and caregivers with the knowledge and materials they need to lead children in investigations of the natural world. The Imaginarium complements themes found in the Hefner Zoology Museum’s main gallery.

In the Imaginarium:
- Three major habitat areas will feature forests, grasslands, and aquatic systems.
- Multiple backdrop scenes in each area will transport children from one habitat to another: deciduous and cloud forests; savannah and prairie; and pond, stream, and coral reef.
- Children will learn while exploring the room’s many hands-on exhibits, including a six-foot-long rotting log, a beehive, a wood thrush nest (large enough to sit in), and an anthill.
- Children will closely examine small objects through magnifying stations, watch live fish and other aquatic creatures in a pond aquarium, and participate in puppet plays that complement the habitat scenes.

Goal
Start renovating and building exhibits for the Imaginarium within the 2004-05 school year.

Need
$50,000 to renovate the room and $200,000 for an endowment to maintain the gallery and provide programming for children, families, and teachers. Total need: $250,000.

Benefits
By joining our effort to provide this environmental education resource to Ohio residents, you will receive several benefits, including the following:
- Naming of the Imaginarium after your company or designated honoree
- Increased company or product recognition among our audiences
- Access to our audiences through logo placements and links on our web site
- Enhanced company identity as an active partner in environmental education and a supporter of Miami University

The Center for Environmental Education and Natural History
Miami University, Oxford, Ohio 45056
www.EnvironmentalEducationOhio.org
The Costa Rica Project

**Project**

Effective environmental education is both a local and a global endeavor. Through the Costa Rica Project, residents of communities in the United States and Costa Rica work together to promote balanced environmental education internationally. In the US, the Costa Rica Project is based in Oxford, Ohio; in Costa Rica, the Project is based in Tortuguero, a narrow strip of land nestled between an intricate system of freshwater river canals and the Caribbean Sea. Through international education and fundraising efforts, the Costa Rica Project aims to accomplish the following objectives in Tortuguero:

- Construct lodging, teaching, and research facilities. Designed for regional and international ecotourists, these facilities also will support training efforts such as the *Green Sea Turtle Program*, designed to prepare local park rangers to patrol beaches for poachers. Further, the facilities will house visiting US teachers who will study environmental topics in Costa Rica and then apply their knowledge in their classrooms.
- Acquire key parcels of land for purposes of education and conservation. Conservation projects include maintaining tree nurseries—particularly for almond trees, the sole food source for the great green macaw, and for sota caballo trees, which can help restore riverbank habitats.
- Develop environmental, economic, and health programs for Costa Rican communities. These programs encourage residents to develop local economies that promote environmental and human health. One such program is the *Healthy Waters, Healthy People Initiative*, which trains residents to monitor the quality of water resources.

**Goal**

Using our efforts in Tortuguero as a model, continue promoting environmental education and conservation throughout Costa Rica.

**Need**

$500,000 for endowment; $300,000 for facility construction; $100,000 for land acquisition; $75,000 for programs over three years; and $25,000 for supplies, furniture, and equipment. *Total need: $1 million.*

**Benefits**

By joining our efforts to promote balanced environmental education internationally, you will receive several benefits, including the following:

- Naming of the lodging, teaching, and research facilities after your company or designated honoree
- Increased company or product recognition among our audiences
- Access to our audiences through logo placements and links on our web site
- Enhanced company identity as an active partner in environmental education and as a supporter of Miami University

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*The Center for Environmental Education and Natural History*
*Miami University, Oxford, Ohio 45056*
*www.EnvironmentalEducationOhio.org*
Accomplishments and Recognition

The GREEN Teacher Institute has received recognition from local and national leaders in science and environmental education. Our participants have also gone on to lead projects that enable students to participate in activities that benefit their local communities.

National Recognition

In 2012, The National Arbor Day Foundation gave the GTI its Green Teacher Award, recognizing the institute’s leadership in enabling a greater number of teachers and students to participate in worthwhile community projects that promote environmental awareness. For more information about this award, please visit http://www.arborday.org/arbor/day/GreenTeacher/2012/index.html.

Recognition From Local Education Leaders

One of GTI’s beloved veterans, Carol Ogden, is the Science Lab Coordinator at Mason Heights Elementary School (Mason City Schools). She recently wrote a public forum letter that expresses what she believes are the long-term benefits of her association with the GTI.

["[**GTI LEAP Teachers Institute is relative to educators because the content weaves national science standards and state proficiency outcomes into workshop content. It is evident that educators and staff have a passion for current educational directives in science. The workshops provide collaboration time to plan and prepare inquiry lessons that reach with varied learning styles and capabilities, ages groups, and cultural backgrounds. The workshops stimulate a fellowship of lifelong learning formed through networking and collaboration. In summary, GTI LEAP (Teachers Institute) workshops and staff have impressed the teaching because I have gained knowledge, professional growth, science resources, a network of fellow educators, and a realistic view of global ecology and the interdependence of living things. I am excited to pass these gifts on to the students I teach because I am confident they will impact the future."

View other comments from educators by clicking on this link.
[See highlighted items on IMSL letters of support]

Accomplishments of GTI Participants

Former GTI participants have developed exciting projects for their students that have had significant impacts on their communities. Please click on the links below to view a short description of each:

- **East Fork Project**
- **Vermicomposting Program**
- **Butterfly/Wildflower and Japanese Gardens**

[The following is the text for the pop-up windows for each link in the list above]

- After participating in several GTI workshops, teachers in rural Clermont County developed the East Fork Project, an integrated science and social sciences unit that takes place entirely outside, to examine the health of Chester Creek. Three schools placed. In addition, the project is co-sponsored by the local Department of Education, which provides teachers with training in the use of the curriculum.
- **East Fork Project**

Text Draft for the GTI Accomplishments Page

[The following text appears as a pop-up window for each link in the list above]

**Museum Resources**

The Museum Resources workshop received an enthusiastic response from its first participants in August 2013.
"This class has been more valuable than probably two-thirds of the classes I took to earn my master's degree."

"Now I can become a more 'comprehensive' teacher and better the presentation of individual topics by relating them to the overall ecological picture."

"Inquiry learning is the way to go!"

"The workshop showed me how I can use the collections, resources/sets of skills, and staff expertise to help me as a teacher and mentor."

"This workshop helps to remind teachers how important collaboration, support, and encouragement are in continuing to nurture our souls as teachers."

Science for Ohio
Here are some teachers' comments on doing the Science for Ohio activities with their classes.

Inquiry: Seeds in Fall....Collect Them All!
"I used this unit with a class of 4th grade gifted students. The students were enthusiastic about this unit. Also, the father works in landscaping, so he was able to bring in his yard. He brought in from his yard were some native plants and they were very diverse. I asked the students to make a list of the plants and bring them to school. The students brought in a variety of plants, including hibiscus, sea grape, and a few other plants from the yard. The father came to our class as a guest speaker to discuss the science behind the plants. I would definitely use this study again. It was easy to use and a good way to tie in all the students learning to use Hyperstudio technology to produce a usable product."
—Linda Sebastian, Teacher for gifted students in grades 2-6, Clermont Northeastern Intermediate School, Liberty Township, OH

Inquiry: The Water Cycle
"I think that this is the best of the Science for Ohio units. I have used it with high school seniors who are in a remedial class because they haven't passed the 8th grade science proficiency. The kids really liked making their water cycle bottles. The instructions were very well written, given in class with mostly ESL students, and I did not have problems. The class I used the lab with decided they didn't want to plant something as boring as grass, so I whipped out some flower seeds. We'll see how well they fit in the small space for growing. The water simulation game is an excellent activity for teaching the interconnection that water has keeps going round and round in a perfect circle through the water cycle. I followed this unit up with the SEEPWUP unit on groundwater contamination in Florida. It was a perfect match."
—Sandra Celesman, Lakota East High School, Liberty Township, OH

Inquiry: Rock Hound Cafe
"This inquiry was terrific! I chose this inquiry because we just started our unit in earth science. I liked all the activities and my students especially enjoyed playing the rock cycle game. In fact, I think they enjoyed it so much that they are planning to make copies of the game to take home and play at home. "All the activities were easy to do and supplies were easy to locate. They were effective and fun. The resources were helpful, especially the Rock Hounds website. I used this site for a computer lab activity and web quest. When I
Appendix 17

GTI Recognition Page

The Center for Environmental Education and Natural History

Recognition

Local, regional, and national leaders have recognized the GREEN Teachers Institute (GTI) for its excellence in providing quality science and environmental education programs for educators. We also have received inspiring testimonials from past participants, many of whom have gone on to create projects that enable students to participate in activities that benefit their local communities. Below is a summary of the recognition we have received, as well as examples of participants’ testimonials.

Awards and Other Recognition

In 2002, The National Arbor Day Foundation bestowed the GTI with its Education Award, recognizing the GTI’s leadership in providing quality professional development programs. The Foundation notes about GTI: "The result [of the GTI programs] is a greater number of teachers each year who are well-equipped to help educate students and other teachers in mini-workshops back home about the importance of environmental conservation." For more information about this award, please visit: http://www.arborday.org/programs/Awards/2002.html

The Science for Ohio web site, a component of the GTI program Science for Ohio, also has received recognition as an effective resource for K-12 teachers. The web site is included in the National Science Teachers Association’s SciLinks, an online resource for teachers that connects them to the best science resources. Each web site included in SciLinks goes through a strict rubric before it is included in the list of SciLinks resources. Science for Ohio also is recognized by the Office of Environmental Education, Ohio Environmental Protection Agency, as an excellent resource for hands-on activities.

Likewise, the GREEN Teachers Institute has gained recognition from several grant-making institutions. In 1995, the advanced workshop, Environmental Education Through Inquiry, was funded by the Ohio Environmental Education Fund (OEEF), Ohio Environmental Protection Agency. In 1997, the Environmental Education Council of Ohio convened a panel to review OEEF project grants targeted for grades K-12. Of 46 projects, only 14 were evaluated as "outstanding," one of which was the GTI advanced effort. More recently, the Institute of Museum and Library Services (IMLS) approved the GTI's application for a 2003 Learning Opportunities Grant. The Learning Opportunities Grant Program is very competitive; the 2003 round had over 950 applicants, less than 19 percent of which were approved for funding. One of only four applicants from Ohio (and one of six from the Ohio-Indiana-Kentucky area), the GTI was the only university-based program in the State supported by IMLS.

Local corporations, particularly Procter & Gamble and Cinergy®, also have recognized the GTI's commitment to providing quality programs for educators. Both companies have supported GTI programs since 1999.

Participant Testimonials

Read our participants' comments about their experiences with the GTI and its workshops:

- GREEN Teachers Institute (overall)
- Museum Resources for Teachers
- Science for Ohio
- Environmental Education Through Inquiry
- The Natural and Cultural History of Costa Rica
Appendix 18

GTI Participant Accomplishments Page

The Center for Environmental Education and Natural History

GTI Home  GREEN Teachers Institute  Biosphere Project  Calendar of Events  Contact Us

GTI Home  Workshops and Applications  Curriculum Connections  Recognition  Participant Accomplishments  History  Sponsors  Staff

Participant Accomplishments

Many GREEN Teachers Institute (GTI) participants go on to initiate intriguing projects with their own students. Often, these projects benefit local communities in significant ways. Several such projects are described briefly below.

East Fork Project

After participating in several GTI workshops, teachers in rural Clermont County developed the East Fork Project, an integrated science and social sciences unit that takes place entirely outside, to examine the countywide impact of the construction of East Fork State Park and Lake Harsha. Funded by a grant from the Ohio Environmental Protection Agency, the unit requires students to look at the environmental, economic, and social impacts of the park and lake, which are ideal outdoor classrooms. A soil study, biotic stream index, economic assessment, and governmental study (which examines the issue of eminent domain, among others) are major elements of the unit. In 1998, the project won a statewide "Best Practice Award" for excellence in education, and although the grant period has expired, the unit is still used by teachers in the county.

Vermicomposting Program

John Farmer, a fifth-grade teacher at Ayer Elementary in suburban Hamilton County, started a schoolwide vermicomposting program to reduce the amount of food wastes generated by students, teachers, and staff members. Guided by Mr. Farmer, students run the program, collecting food scraps from the cafeteria in order to maintain vermicompost (worm) bins. Inside the bins, earthworms—with the help of soil microbes—break the scraps down into their constituent nutrients. One product of this process is nutrient-rich earthworm castings (wastes), which the students and Mr. Farmer sell as a high-quality soil supplement to area residents and businesses. All profits from the vermicomposting program, which is still in operation today, are used to purchase equipment for the school's science program.

Butterfly/Wildflower and Japanese Gardens

As a result of the advanced workshop's emphasis on the natural history of native butterflies and other endemic species, teachers at numerous schools in Clermont, Hamilton, Butler, and Warren counties have started butterfly gardens or natural areas on school grounds or have greatly enhanced and expanded existing areas. Marcia Davis, who works with at-risk students at Clermont's Amelia Middle School, provides an excellent example of this dynamic type of learning. Ms. Davis's students helped to design and create both a butterfly/wildflower garden and a smaller Japanese garden. The students did much of the work, digging out garden beds and planting, mulching, and weeding them. Ms. Davis sought needed donations (plants, shrubs, garden benches, supplies, and so forth) from local garden centers; the students wrote thank-you notes to the donor businesses. Through their work, the students learned a great deal about plants, plant and animal interactions (particularly with respect to butterflies and their caterpillar larvae), and soils. As an additional benefit of their work, they also gained a measure of self-respect; the students take great pride in the beautiful surroundings that they have helped to create for the entire school.
The mission of the Hefner Zoology Museum is to promote an understanding of animal natural history, with particular focus on the animals of Southwest Ohio. Our goal is to develop in our audiences an understanding of, and appreciation for, the importance of animal biodiversity, conservation, and ecology. We seek to achieve our goal through the systematic collection, care, and display of specimens for education and research. The museum is committed to enhancing science and environmental education for diverse audiences in Southwest Ohio. To this end, we emphasize professional development for K-8 educators through the GTI.

The museum advances its mission by following its strategic plan, which includes key components for both education and research. For the purpose of education (which is the focus of this proposal), there are three key components: design and maintain inviting, educational exhibits that incorporate the museum’s collections; develop science and environmental education programs that use the museum’s resources and build upon the staff’s expertise in life sciences and education; and promote frequent, meaningful visitor interaction with all museum resources (namely, exhibits, collections, and staff).

The museum’s 60-year history as part of Miami University attests to the institutional support the museum has enjoyed since its inception. Miami University, a state-assisted institution established in 1809, is committed to excellence in education and the liberal arts and sciences. The University awards baccalaureate degrees in 71 fields; master’s degrees, including secondary science teaching certification, are offered in chemistry, physics, biology, and earth sciences. Elementary teaching certification, with a concentration in science teaching, may be obtained through baccalaureate or master’s degree programs. The pre-service elementary education program is in strict compliance with the National Science Teacher Association’s standards for elementary science teachers. A Master’s degree in Environmental Science, with a concentration in environmental education, can be earned through the University’s Institute of Environmental Sciences. The Hefner Zoology Museum is an active oncampus resource for undergraduate and graduate students pursuing these science and education degrees. In 2001, the University demonstrated strong support for the museum by awarding it $200,000 for the development of seven new natural history exhibits. (Please see Attachment A for exhibit descriptions.)

Like the Hefner Zoology Museum, the GTI has a long history of success, which largely has been shaped by the teachers and administrators that it serves. The GTI staff (which, since 2001, is also the museum staff) has been developing intriguing and effective science and environmental education programs since 1986, when we began working with elementary teachers to help them teach science more effectively through the use of hands-on activities. Many of the teachers with whom we worked expressed a desire to learn more about life sciences and environmental studies. In response, we developed Leadership in Environmental Education, an introductory program for K-8 teachers that focuses specifically on ecology and environmental studies. We offered this program, funded by the Ohio Environmental Education Fund (OEEF, administered by the Ohio Environmental Protection Agency), for the first time in 1992.

Enthused by their newly acquired knowledge and excited about science, many of the participating teachers told us that they wanted to learn more about ecology, natural history, and environmental studies. Consequently, in 1996, at the urging of teachers and with their input, we designed an inquiry-based and field-oriented program entitled Advanced Environmental Education through Inquiry. Funded by the OEEF and Miami University, that pilot program marked the official genesis of the GTI, which enveloped both the introductory and advanced programs and transformed them into a progressive, ongoing series of professional development opportunities. (Please see Attachment B for participants’ evaluations of the 2001-02 introductory and advanced workshops.) In 1999, we added a master-level opportunity to the professional development series: Natural and Cultural History of Costa Rica. We did so in response to requests by veterans of our 1996 advanced workshop; they wanted to study, first-hand, the variety, structure, and function of tropical ecosystems—important topics in many teachers’ curricula. Teachers who complete the introductory and advanced GTI efforts are eligible to participate in the master workshop, which is supported by the Procter & Gamble Fund and the Cinergy Foundation (both based in Cincinnati, Ohio).

Museum Resources for Teachers signals the full integration of the GTI and the Hefner Zoology Museum. While retaining the GTI’s emphasis on hands-on and inquiry-based science, it expands teachers’ resources to include those in non-formal learning environments. As with all GTI programs, Museum Resources for Teachers is funded by Miami University and external sources. (Two regional external sources, the Greater Cincinnati Foundation and the Molyneaux Foundation, have provided support for year 1 of the program.) External sources are essential because the University’s contribution is contingent upon program enrollment, and we cannot offer this program in the absence of sufficient external funding.

Because all GTI programs are offered through the Hefner Zoology Museum, they help to ensure the museum’s financial stability. Given that science and environmental education programs are an essential component of the museum’s strategic plan, the GTI’s strong record of past and current funding indicates that the museum will be able to continue and expand its outreach work. Further, the museum has a small endowment for use in designing and maintaining exhibits and collections, which are vital resources on their own as well as in various GTI programs.

Appendix 19

GTI History Excerpt from IMLS Grant

The mission of the Hefner Zoology Museum is to promote an understanding of animal natural history, with particular focus on the animals of Southwest Ohio. Our goal is to develop in our audiences an understanding of, and appreciation for, the importance of animal biodiversity, conservation, and ecology. We seek to achieve our goal through the systematic collection, care, and display of specimens for education and research. The museum is committed to enhancing science and environmental education for diverse audiences in Southwest Ohio. To this end, we emphasize professional development for K-8 educators through the GTI.

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Enthused by their newly acquired knowledge and excited about science, many of the participating teachers told us that they wanted to learn more about ecology, natural history, and environmental studies. Consequently, in 1996, at the urging of teachers and with their input, we designed an inquiry-based and field-oriented program entitled Advanced Environmental Education through Inquiry. Funded by the OEEF and Miami University, that pilot program marked the official genesis of the GTI, which enveloped both the introductory and advanced programs and transformed them into a progressive, ongoing series of professional development opportunities. (Please see Attachment B for participants’ evaluations of the 2001-02 introductory and advanced workshops.) In 1999, we added a master-level opportunity to the professional development series: Natural and Cultural History of Costa Rica. We did so in response to requests by veterans of our 1996 advanced workshop; they wanted to study, first-hand, the variety, structure, and function of tropical ecosystems—important topics in many teachers’ curricula. Teachers who complete the introductory and advanced GTI efforts are eligible to participate in the master workshop, which is supported by the Procter & Gamble Fund and the Cinergy Foundation (both based in Cincinnati, Ohio).

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Appendix 20

GTI History Page

The Center for Environmental Education
and Natural History

History of the GREEN Teachers Institute


In 1999, we added a master-level opportunity to the professional development series: *The Natural and Cultural History of Costa Rica*. We did so in response to requests by veterans of our 1996 advanced workshop; they wanted to study, first-hand, the variety, structure and function of tropical ecosystems—important topics in many teachers' curricula. Teachers who complete the introductory and advanced GTI efforts are eligible to participate in the master workshop.
Visit the Hefner Zoology Museum

Hours
Monday-Friday
9:00 am-5:00 pm

Sunday
1:00 pm-4:00 pm

Address
Hefner Zoology Museum
100 Upham Hall
Miami University
Oxford, Ohio 45056
(513) 529-4617

Parking Information
During weekdays, visitors who are not Miami University students, faculty, and staff need a visitor permit to park on campus. Visitors should stop by Parking Services in Room 15 of the Campus Avenue Building when they arrive on campus to get a visitor permit. For visiting school groups, please make arrangements with museum staff.

Permits are needed to park on campus in university lots and on the streets that run through the campus between 7 am-6 pm Monday through Friday. After 6 pm weekdays and all day Saturdays and Sundays, visitors who do not have visitor permits should park on the city streets. Permits are needed to park in university lots at all times.

Non-Miami University visitors who receive a parking ticket may request to have it cancelled by following the directions on the back of the citation.

Office hours of Parking Services are 8 am-6:30 pm Monday to Thursday and 8 am-5 pm Friday during the school year. During summer, the office is open from 7:30 am-4:30 pm, Monday to Friday. For more information, visit their web site at:
http://www.units.muohio.edu/prk/visitorinfo.html
Visitor Information

Visit the Hefner Zoology Museum!

Address
100 Upham Hall
Miami University
Oxford, Ohio 45056
Phone: (513) 529-4617

Hours
Monday-Friday (year-round)
9:00 am-5:00 pm

Sunday (September through May)
1:00 pm-4:00 pm

Parking
On weekdays, visitors who are not Miami University students, faculty, or staff need a visitor permit to park on campus. When they arrive on campus, visitors first should go to Parking Services in Room 15 of the Campus Avenue Building to obtain a permit. For school groups, please make arrangements in advance with museum staff.

Permits are needed to park in all university lots and on campus streets. Visitors who do not have permits should park on city streets.

On Sundays only, visitors may park in the West Cook Field lot (parallel to Patterson Avenue) without a permit.

Non-Miami University visitors who receive a parking ticket may request to have it cancelled by following the directions on the back of the citation.

Office hours for Parking Services are Monday-Thursday, 8:00 am-6:30 pm, and Friday, 8:00 am-5:00 pm, during the school year. In the summer, the office is open Monday-Friday, 7:30 am-4:30 pm. For more information, visit the Parking Services web site at:
http://www.units.muohio.edu/prk/visitorinfo.html
Appendix 23
HZM Teaching Resources Page

The Center for Environmental Education
and Natural History

Teaching Resources
Scavenger hunts, learning brochures, and activity kits are several resources available
to teachers through the museum. These resources are described below.

Scavenger Hunts
The following scavenger hunts engage students as they find and learn about museum
specimens and objects:

- Scavenger Hunt I. for primary grades
- Scavenger Hunt II. for intermediate grades and junior high

Learning Brochures
This series of question-and-answer brochures encourages students to carefully observe and
analyze information from the museum’s exhibits. To download the brochures and the
accompanying lesson plan/teacher’s answer key, please click: brochures.zip

Activity Kits
Activity kits allow teachers to use some of the museum’s collections in their classrooms. The
following kits currently are available, and we encourage you to contact the museum for
other special requests. Please also visit the museum’s Virtual Tour: Each museum exhibit
featured in the tour contains a “Teaching Tools” link to related activities.

Fossil Kits—These kits contain different types of fossil specimens from the Ordovician
Period. See the Web Of Life 1 teaching tools page for lessons that use these specimens.

Skull Kit—This collection can be used in lessons about measurement and comparison as
well as those concerning predator-prey relationships. See the Web Of Life 2 teaching tools
page for lessons that use these specimens.

Dichotomous Keys Kits—These kits include animal classification activities for primary
grades using plastic insects and lizards, or skull specimens for the higher grades. See the
What’s In A Name: Classifying Organisms teaching tools page for activities that use these kits.
Appendix 24
Support the Museum Page

The Center for Environmental Education
and Natural History

Support the Museum

The Hefner Zoology Museum is supported by university funds and private donations. If you are looking for an opportunity to help raise environmental awareness and support environmental education in Ohio, the Hefner Zoology Museum is a good place to start.

Individuals can make donations through the Friends of the Museum fund. In addition, the exhibits, programs, and special projects described below are available for full or partial sponsorship and naming (except for the Paul M. Daniel Classroom).

Friends of the Museum
We appreciate your contributions, whatever the size! For more information, please contact:

Lisa Rosenberger
Hefner Zoology Museum
Miami University
Oxford, OH 45056
(937) 592-0036
rosenbergl@muohio.edu

The Center for Environmental Education and Natural History

The Center for Environmental Education and Natural History (the Center) encompasses the Hefner Zoology Museum and all related resources and endeavors: physical spaces/ galleries, exhibits, educational programs (including the GREEN Teachers Institute), environmental curriculum materials (including the Biosphere Project), and conservation projects. Miami University officially recognized the Center in January 2004. The Center currently is seeking an endowment of $2 million.

Exhibits

Exhibit sponsorship includes support for each exhibit's related programs and activities. Click on the appropriate links below to view an exhibit's Virtual Tour page.

1. The Vernal Pool: A Spring Phenomenon—$20,000
2. Animals of Southwest Ohio Mural—$3,000
3. Animal Classification—$20,000
4. Naturalist's Desk—$15,000
5. Web of Life (3 displays)—$30,000
6. Home—$50,000
7. Environmental Modification (4 displays)—$20,000

Programs for Teachers

Teachers can enhance their ability to teach science through the Hefner Zoology Museum's GREEN Teachers Institute (GTI), the programming arm of the Hefner Zoology Museum. The GTI currently offers five workshops:

1. Museum Resources for Teachers
2. Science for Ohio
3. Water Resources
4. Environmental Education Through Inquiry
5. The Natural and Cultural History of Costa Rica

With a $5,000 donation, you can support any one of these workshops for 30-40 teachers.

Special Projects

Seeking to help the museum fulfill its mission in years to come, we are developing several special projects that will enhance and expand the museum's resources:

1. The museum's smaller gallery (112 Upham Hall) will be redesigned as the Imaginarium, a discovery center for children ages 3-8. $50,000 for redesign; $200,000 for endowment
2. The Paul M. Daniel Classroom, Mammal Lab, and Library will be reinvigorated spaces for research and teaching. $200,000 per room for endowment
Appendix 25

User Test Questionnaire

Center for Environmental Education and Natural History Web Site
User Test, March 2004

Please answer the following questions about the Center web site. Your input will help to refine the site before it goes live.

Navigation
1. After you click a tab to enter a sub-site, how do you move around within that subsite?
2. How do you get back to the Center home page after you click a tab?
3. Did you get “lost” anywhere within the web site? If yes, please list the location and describe the cause of confusion.
4. Did you find any broken links? If yes, please list the location.
5. Did you find any confusing links? (Did you expect a link where there wasn’t one?
Did the color of a link “throw you off”?)

Visual Design
1. Would any of the pages you visited benefit from the addition or deletion of graphics?
2. Is there enough contrast among text, background, and graphics?
3. Do you find the chosen colors complementary? If no, please list alternative suggestions.

Text
1. Please list any section, sentence, or phrase that was unclear to you.
2. Please list any typos you found.
3. Did you spend too much time scrolling on any page you visited? If yes, please list.
Memo

To: Lisa Rosenberger
From: Corrine Que
Re: User Test Report for the Center Web site
Date: April 9, 2004

This report summarizes the results of a user test of the Center for Environmental Education and Natural History Web site conducted Wednesday, March 31, through Tuesday, April 6. The user test was performed by participants on their own time (without being observed). I have organized this report according to the topics in the user test questionnaire given to the participants: navigation, visual design, and text.

Navigation

Test participants found the site simple and easy to navigate. Out of five questionnaires returned so far, two indicated that they recognized the banner tags as a link to the Center home page; two used the text link at the bottom, and one thought that the "Center home page" referred to the EE Page, and thus used the footer icon. Most of the participants, however, were able to find the Center home page and all were able to navigate through the other pages easily. I expect that when participants become more familiar with the site, they will be able to more easily distinguish between the portal and Center home pages, the terminology also might not have been clear in the user test questionnaire.

Broken Links

A few broken links were noticed by participants; two of these links were to pages that haven't been constructed, and three were broken links that somehow escaped Dreamweaver's link checker. I have already contacted these links (GTH link on the BioSphere Project page, Contact link on the bottom bar, and PDF links on the workshops application page), and will be checking links again when the Teaching Tools pages, currently in their last stages of development, are finished. One participant was not able to connect to the Ohio Department of Education's link under "curriculum connections," but I did not find a problem with this link when I tested it on our computers.

Confusing Text Color

Lastly, a participant noted that when using green to emphasize some of the body text, he/she expected that the green text would be a link, probably because the same green is used in the links at the left and in the default "visited links" color. I removed this green text from the Center Events & Activities page and looked for other occurrences in other pages; I did not find any.

Other Points of Confusion

One point of confusion for a participant was the anchor links on top of the GTH Workshops page. He expected the links to go to another page rather than just down the page. This participant also mentioned that the absence of additional links under Center Events & Activities page seems strange because all the other categories (sub-sites) have links. While any changes based on the second point seem unnecessary, I feel that the first point (anchor links) merits additional thought. I have used the same strategy for the Teaching Tools (TT) pages, and perhaps we should test these pages with the direct users to see if they will find the anchor links confusing. A difference between the workshops page and the TT pages is that there is a periodic "back to top" link on the TT pages, which makes obvious to the user that the anchor links at the top of the page are meant to lead them to a lower portion of the document instead of to another page. Adding this "back to top" link to the workshops page might be a solution if we find the workshops page to be confusing upon closer examination.

Visual Design

Most of the participants' comments on visual design were positive. The participants liked the color scheme; one mentioned that the blue and green represented sea and sky. All of them considered the pictures and text to be at the right combination, with one saying that more pictures would mean more scrolling. One participant found that there was not enough contrast between the buttons at the bottom of the page and the background. Upon investigation, I found that he/she was referring to the "visited links" color, a shade of green slightly darker than the green on the background (unvisited links are blue, the default link color). I tried to improve the dark green color so it was because this is the default "visited links" color for all the other links on the page, and this color works well on the white page background, the green bottom bar background, and the blue left-hand background on the Biosphere Environmental Science in Action course page. I could only specify one color for the visited links due to technical limitations.

Text

Test participants did not have many comments on the text. One comment was to revise the last sentence on the museum's mission statement, which we are already planning to revise. Another comment was to add more description to the acronyms, which I will do as soon as I receive the files I need. A few typographical errors were also noted: an extra space before a comma, a misplacing, and a formatting error (GTH staff page, Dave Burt's bio), all of which I have corrected.

Conclusion

The user test results revealed that the Center web site is a well-designed easy-to-use web site. A few broken links and typographical errors were found and corrected. One remaining point we may have to think about is the confusion caused by anchor links that jump down the page on the GTH workshops page. I will be glad to hear your feedback on this point, and any other comments that you may have.

Thank you very much!
Appendix 27

GTI Workshops Page

The Center for Environmental Education
and Natural History

GTI Home
Workshops and Applications
Curriculum Connections
Recognition
Participant Accomplishments
History
Sponsors
Staff

back to top

Summer 2004 Workshops and Applications

The GREEN Teachers Institute (GTI) offers three levels of workshops designed to help K-8 educators teach topics related to science and the environment more effectively through the use of hands-on activities and field experiences. We welcome applications from K-8 teachers in regional public and private schools. Participants can teach any subject, as environmental themes can be used across curricula.

The workshops are described briefly below; you can find more detailed information about each workshop in the downloadable application forms. Applicants to the Level 3 (master) workshop need to have completed at least one Level 1 (introductory) workshop and the Level 2 (advanced) workshop. You can find more information about submitting applications at the bottom of this page. The application deadline for the Summer 2004 workshops has been extended to May 31. Note: Although all workshops are now filled, you may still send in your applications to be placed on the waiting list.

Level 1 (Introductory) Workshops

Three Level 1 workshops are offered this year: Museum Resources for Teachers, Science for Ohio, and Water Resources, a new workshop that focuses on aquatic ecosystems.

Museum Resources for Teachers

In this two-week workshop, K-8 educators use the Hefner Zoology Museum and its exhibits and collections to develop science and environmental activities for use in nonformal settings. Participants earn 4 graduate credits for the summer workshop and 2 graduate credits for two follow-up meetings held during the academic year. This workshop is open to 25 teachers in each session, and there is a $300.00 stipend. Two sessions of this workshop are offered.

Schedule: Weekdays, June 14-25, at Miami University
Weekdays, August 2-13, at Miami University
Both sessions of this workshop are now filled.

Downloadable form: Museum Resources for Teachers application form.pdf
(You will need Acrobat Reader to open this file.)

Science for Ohio

This one-week workshop uses the Science for Ohio web site. Developed by GTI veteran John Farmer, the Science for Ohio web site contains an extensive set of inquiry activities that K-8 teachers can conduct in their classrooms. This workshop allows participants to explore ways in which the online resources can be used in their curricula. Participants earn 2 graduate credits for the summer workshop and 2 graduate credits for the distance learning activities completed during the academic year. Participants must register for the distance learning activities in addition to the summer workshop. This workshop is open to 20 participants. There is a $100.00 workshop fee. (Exception: There is no fee for Mason City Schools teachers.)

Schedule: Weekdays, July 26-30, tentatively at Cherokee Elementary School
(Lakota School District)
This workshop is now filled.

Downloadable form: Science for Ohio application form.pdf
(You will need Acrobat Reader to open this file.)

(continued on the next page)
Water Resources
This new one-week workshop focuses on aquatic ecosystems and the environmental issues that affect them. Participants explore a pond, lake, stream, wetland, and groundwater source. They earn 2 graduate credits for the summer workshop and 2 graduate credits for two follow-up meetings held during the academic year. This workshop is open to 20 teachers. There is a $100.00 workshop fee. (Exception: There is no fee for Mason City Schools teachers.) Two sessions of this workshop are offered.

Schedule: Weekdays, July 5-9, at Miami University*
Weekdays, July 12-16, at Miami University
*Both sessions of this workshop are now filled.

Downloadable form: Water Resources application form.pdf
(You will need Acrobat Reader to open this file.)

Level 2 (Advanced) Workshop

Environmental Education through Inquiry
Participants in this two-week workshop undertake intensive, inquiry-based study of the ecology and natural history of Southwest Ohio ecosystems. Participants earn 4 graduate credits for the summer workshop and 2 graduate credits for two follow-up meetings held during the academic year. This workshop is open to 40 participants. There is a $100.00 workshop fee. (Exception: There is no fee for Mason City Schools or Clermont Northeastern teachers.)

Schedule: Weekdays, June 14-25, at a Clermont Northeastern School
This workshop is now filled.

Downloadable form: Environmental Education Through Inquiry application form.pdf
(You will need Acrobat Reader to open this file.)

Level 3 (Master) Workshop

The Natural and Cultural History of Costa Rica
Teachers who satisfactorily complete at least one Level 1 workshop and the Level 2 workshop may apply for the Level 3 offering—two weeks spent in Costa Rica studying the natural and cultural history of this incredible country. For more information on applying to the Level 3 workshop, please contact Cecilia Franz Berg by phone (513-529-6085) or email (bergcf@mohio.edu).

Application Information
To request more information about the Level 1 and 2 workshops, obtain a paper copy of an application, or submit your completed application, please contact Mike Wright at the address below. Inquiries about the Level 3 workshop should be directed to Cecilia Franz Berg.

Mike Wright
Department of Zoology
Miami University
Oxford, OH 45056
(513) 529-6084
wrightmf@mohio.edu
Memo

To: Don Kaufman  
Cc: Lisa Rosenberger, Cecilia Franz Berg, Mike Wright  
From: Corinne Que  
Re: Transmittal Document for the Center Website  
Date: April 22, 2004

I am pleased to report that the Center for Environmental Education and Natural History (the Center) web site is now complete. The Center website is comprised of the Heinz Zoology Museum, GREEN Teachers Institute, and Biophere Project sub-sites, along with the Center’s Home, Events and Activities, and Contact Us pages. The Center website is accessed from the portal page, www.environmentaleducation.ohio.edu, which contains links to the Center’s main web pages and three links to external affiliate sites: Science For Ohio, ECHO, and the Costa Rica web sites. In this memo I briefly describe the web development project, give recommendations for updating the site, and list the locations of the working files needed throughout the project.

The Center web site was completed through the combined efforts of Mike Wright, Lisa Rosenberger, Cecilia Franz Berg, and myself. Mike, Lisa, and I worked as a team to finalize the site’s visual design, with Mike creating the main banner and choosing the color scheme. The three of us used Cinnamon Desser’s initial work on the site’s navigational architecture and refined it to the final scheme used in the web site. Finally, Lisa, Cecilia, and I worked on the text—I wrote the drafts based on several sources, including existing museum documents, and Lisa and Cecilia edited the text and made valuable suggestions for improving its tone and content.

In addition to the textual reviews, the Center web site was subjected to a user test. The user test validated the effectiveness of the web site. I have attached a copy of the user test report to this memo for your reference. The test shows that participants found the web site easy to navigate and the visual design attractive. The test also revealed a few broken links and points of confusion that have been corrected since.

The attached document, The Center for Environmental Education and Natural History Web Site Technical Specifications, contains the technical specifications for the web site, including the site organization, technologies used to create the site, and instructions for updating the web site. As web sites are usually one of the main communication tools of an organization, periodical updating of the site is essential. The following table lists the web pages that will probably need to be updated, and the corresponding suggestions/reminders for updating.

<table>
<thead>
<tr>
<th>Web page</th>
<th>Updates Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Events and Activities</td>
<td>Updates once per semester and whenever special events, such as children’s weekend programs about animals, are planned</td>
</tr>
<tr>
<td>Heinz Zoology Museum Home</td>
<td>A short “Look What’s New” section at the bottom of the page featuring a new project that is imminent or underway, for example, the construction of the Imaginarium—with a link to the museum’s News page for more news</td>
</tr>
</tbody>
</table>

(Continued from previous page)

<table>
<thead>
<tr>
<th>Web page</th>
<th>Updates Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heinz Zoology Museum News</td>
<td>Updates at least once per semester or as needed</td>
</tr>
<tr>
<td>Heinz Zoology Museum Store</td>
<td>New items, such as board games, as they are developed</td>
</tr>
<tr>
<td>Heinz Zoology Museum Special Programs</td>
<td>New Science Alliance topics every semester</td>
</tr>
<tr>
<td>Teaching Tools pages</td>
<td>New activities, particularly for the Web of Life 3, which currently does not have any activity, and the Environmental Modification exhibit, which currently has only one activity each</td>
</tr>
<tr>
<td>GREEN Teachers Institute Sponsors</td>
<td>New sponsors</td>
</tr>
<tr>
<td>GREEN Teachers Institute Recognition</td>
<td>New awards and recognition</td>
</tr>
<tr>
<td>GREEN Teachers Institute Summer Workshops</td>
<td>Yearly change in workshop information during the academic year; include an update on each workshop’s status; for example, Saturday meeting dates and follow-up project deadlines</td>
</tr>
<tr>
<td>Biophere Books and Resources</td>
<td>Updated book information for new edition of Biophere 2000</td>
</tr>
</tbody>
</table>

The following lists the location of working folders for the web site on the white Mac:
- www.environmentaleducation.ohio.edu on the Desktop contains the local copy of the Center web site.
- Site Archives on the Desktop contains the local copy of the Site Archives (diC Center web site). Teaching Tools in the Documents folder contains the editable MS Word files for the Teaching Tools lesson plans and handouts. Web images in the Documents folder contain the original images used in the web site, including Fireworks PNG files used to generate the template, as well as original photos and icons.

Thank you for the opportunity to work on this truly rewarding project. If you have any questions, concerns, or comments, please do not hesitate to contact me through the following email: quepc@osu.edu. After August 2004, please use my permanent email address: cpque@osu.edu.

Thank you very much!
The Center for Environmental Education and Natural History Web Site

Technical Specifications

by

Corinthia P. Que
Museum Intern

April 22, 2004

Table of Contents

Introduction ............................................................................................................. 1
Site Organization ................................................................................................. 2
Site Map ................................................................................................................. 2
Images, Shockwave Flash, and Library Files ...................................................... 4
Local and Remote Site Management in Dreamweaver ...................................... 5
  Connect to the Remote Site .............................................................................. 5
  Synchronize Files in Dreamweaver ................................................................. 5
  Change the Location of the Local Site ............................................................. 7
Building the Site ................................................................................................ 7
Layout in Fireworks ............................................................................................ 7
  Fireworks Essentials ....................................................................................... 7
  Creating the Template ..................................................................................... 8
  Creating the Template Tab Links .................................................................... 8
  Exporting to Dreamweaver ............................................................................. 9
  Creating the Left Navigation Bar ................................................................... 10
  Exporting the Left Navigation Bar ................................................................ 11
Edit in Dreamweaver .......................................................................................... 12
  Header Information ......................................................................................... 12
  Inserting the Left Navigation Bar Library ...................................................... 13
  Using CSS Styles to Format Text ................................................................... 13
  Adding the Bottom Bar Library ..................................................................... 14
  Using the CSS Style Sheet (Teaching Tools only) ......................................... 14
Edit in Flash (Virtual Tour only) ...................................................................... 16
  Flash Text Links in Dreamweaver ................................................................. 16
  Scrolable Flash Text ....................................................................................... 17
Produce PDFs (Teaching Tools only) ................................................................. 18
  Convert to PDF ............................................................................................. 18
  Add Links ...................................................................................................... 18
  Optimize for Web Viewing .......................................................................... 19
Updating the Site ............................................................................................... 19
Editing Existing Web Pages .............................................................................. 19
Creating a New Page ........................................................................................ 20
Adding a New Link to the Left Navigation Bar ................................................ 20
Updating the Site Map ...................................................................................... 21
<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Checklist for Activities Editing Project</strong></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td>3</td>
<td><strong>Activity Title</strong></td>
<td><strong>Main Exhibit</strong></td>
<td><strong>Cross-referenced by</strong></td>
<td><strong>Monday</strong></td>
<td><strong>Tuesday</strong></td>
<td><strong>Wednesday</strong></td>
<td><strong>Thursday</strong></td>
<td><strong>Friday</strong></td>
<td><strong>Monday</strong></td>
</tr>
<tr>
<td>4</td>
<td>Eggsactly</td>
<td>Egg Cabinet</td>
<td>Home</td>
<td>Corrine Feb 4</td>
<td>Lisa Feb 5</td>
<td>Corrine Feb 12</td>
<td>Don Feb 24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Exploration</td>
<td>Egg Cabinet</td>
<td>Corrine Feb 4</td>
<td>Lisa Feb 3</td>
<td>Corrine Feb 6</td>
<td>Don Feb 11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Egogestally</td>
<td>Egg Cabinet</td>
<td>Home</td>
<td>Don Feb 3</td>
<td>Corrine Feb 4</td>
<td>Lisa Feb 5</td>
<td>Corrine Feb 7</td>
<td>Don Feb 11</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Trip Back In Time</td>
<td>Naturalist’s Desk</td>
<td>Corrine Feb 2</td>
<td>Don Feb 3</td>
<td>Corrine Feb 4</td>
<td>Lisa Feb 5</td>
<td>Corrine Feb 7</td>
<td>Don Feb 11</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>You Are Never Too Small (Animal Myth)</td>
<td>Naturalist’s Desk</td>
<td>Corrine Feb 2</td>
<td>Don Feb 3</td>
<td>Corrine Feb 4</td>
<td>Lisa Feb 5</td>
<td>Corrine Feb 7</td>
<td>Don Feb 11</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Origins Of Disease</td>
<td>Naturalist’s Desk</td>
<td>Corrine Feb 7</td>
<td>Don Feb 10</td>
<td>Corrine Feb 11</td>
<td>Lisa Feb 18, gotta talk with Don</td>
<td>Corrine Feb 19</td>
<td>Don Feb 24</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Fossil Concentration</td>
<td>Web of Life 1</td>
<td>Corrine Feb 10</td>
<td>Don Feb 11</td>
<td>Corrine Feb 11, Fact page still needed</td>
<td>Lisa Feb 18</td>
<td>Corrine Feb 19, include Short Geol Fact Sheet with Don’s packet; add link to map in sheet later, still needs Handouts from Don, check uplifting, all around</td>
<td>Ok, add link to map in PDF file later</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Go Diggin’ for Fun with Fossils</td>
<td>Web of Life 1</td>
<td>Corrine Feb 10</td>
<td>Don Feb 10</td>
<td>Corrine Feb 11</td>
<td>Lisa Feb 18</td>
<td>Corrine Feb 19, need instructions for making Go diggin’ box + check Lisa’s email response, check uplifting, all around</td>
<td>Ok</td>
<td></td>
</tr>
</tbody>
</table>