

Hemlock Bluffs Explorer Program

by

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Abstract

Advances in technology in the past decade, particularly in entertainment technology, have resulted in children spending more time indoors. Many fear that children are beginning to grow up with not only “nature deficit disorder”, but “ecophobia” as well. For this reason it has become the goal of many park managers, nature programmers, and parents to get children out into the natural world. This project concentrated on revitalizing the “Junior Explorer” activity booklet at Hemlock Bluffs Nature Preserve (HBNR) in Cary, NC designed for children ages 5-12 years. By splitting it into two booklets for ages 5-8 years and 9-12 years the activities created were more age-appropriate for children at their developmental level. Some appropriate activities from the original booklet were reused, and to create the new activities many websites and activity booklets from other natural areas were examined. These activity booklets can help children to learn about the environment at their own pace while fostering an affinity for HBNR, which could lead to environmentally responsible behavior throughout their community.

Introduction

Richard Louv (2005) has written about the possibility of this generation of children growing up with nature deficit disorder. He may be right. When children are spending more time indoors playing games than out in nature, giving children a fun way to learn about nature at their own pace is important. Teaching children about nature is important not only for the environment, but for children as well (Wilson, 1994). The benefits to the environment are more obvious. Wilson explained that pairing early childhood education and environmental education is a way to develop “environmentally literate and concerned citizenry who will relate to the natural world in a responsible and caring manner” (p. 5). If environments are to be secure for future generations to enjoy, the coming generation must be taught how to care for and preserve it, rather than destroy it. This argument may be the most logical in teaching children about nature and making the environment a focus early in their development. Simply teaching children to save the environment, however, without first teaching them to love and appreciate nature is not enough (Louv, 2005). Teaching children about the environment and getting them to experience nature may help sustain the environment and help children in innumerable ways.

My personal philosophy is that if you try to live life to the fullest you can stop to see the important details and keep the wonder of life alive. This philosophy applies to all fields of life, but is particularly important for programmers to help people experience activities more fully. Programs should be structured to allow people ample time to enjoy the experience. My experience has taught me that such structures are important for children and programmers should consider the possibilities. Part of what programmers

like me hope is to make sure the magic of the world is available for children the way it was there for us. If you live every moment to its fullest, then you take the time to care for the world because you have taken the time to notice it more fully.

The second element to my philosophy is that people need to appreciate nature and be more aware of the impact they have on the world around them. This idea goes along with the previous philosophy in that it is important to take time to “smell the roses” as the cliché goes. When you take time to notice the world around you and really start to appreciate it, you realize what you and others are doing to the environment by such actions as littering, polluting the air, and clear-cutting areas to make room for more shopping centers that we don’t need. I believe that people need to always be working to preserve the environment and educate others on how to do the same. By educating people, especially children, on the importance of the environment we are helping the next generation to appreciate and care for the earth and all its inhabitants. To reach this goal, we must find a middle-ground between teaching children about the environment and letting them freely enjoy it. By finding this equilibrium outdoor managers and programmers can show people how to be stewards of the environment by using, and not abusing, the resources offered.

For my project I worked with Stevens Nature Center (SNC) at Hemlock Bluffs Nature Preserve (HBNR) in Cary, NC to revitalize the “Junior Explorer” activity booklet to better fit the needs of HBNR and the visitors who are children. I discussed this project with the Nature Center Supervisor, Laura White. I work as a Park Attendant and Nature programmer at HBNR. She wanted to update the activity booklet to fit the new exhibits that resulted from major changes at the SNC. The center benefits from updates that allow

patrons to expand their knowledge of not only HBNR, but also the natural world that surrounds them.

Before renovations at the SNC, the exhibit hall was informative but not visually stimulating. Patrons who chose to visit the exhibit hall in the past did not usually stay long enough to absorb the information available. For the update the SNC staff developed stimulating new displays, installed a mini-theater, and commissioned new dioramas. Since then, patrons have spent more time examining all that the center has to offer and sharing it with their children as well. Although many structured children's programs allow them to experience other aspects of HBNR, none explore the exhibit hall. During most nature programs the patrons are taken out into HBNR to experience the topic of interest first hand in the outdoors with rarely a trip into the exhibit hall. Children, therefore, do not generally experience SNC unless they do it on their own or if their parents take them. The activity booklet was updated to give children an opportunity to explore the center and learn from it by taking part in activities that would otherwise be unavailable through other nature programs.

My central task for this project was to recreate the "Junior Explorer" activity booklet by adjusting the content for the new exhibits and then splitting it into two booklets for age groups 5-8 years and 9-12 years. Children work through activities and guidelines in the booklet at their own pace to receive a badge showing their knowledge of the HBNR. The original booklet targeted children ages 5-12 years, but some of the activities were not age-appropriate and seemed limiting for the children. The activities that were deemed useful have remained as the original author created them, but more activities have been added to make the booklets more engaging, fun, and age-appropriate.

These activity booklets can give children an interesting way to explore Hemlock Bluffs and show that they are learning about the natural world.

Literature Review

For background research I delved into literature about the value of nature for children, the developmental levels of children, place attachment, and environmentally responsible behavior (ERB) as well as used other examples of activity booklets in natural settings. In his book, *Last Child in the Woods*, Richard Louv (2005) used research, theories, and stories from people all over the world to explain the intrinsic and necessary connection that children should have with nature and the problems surrounding recent generations who are not getting enough nature. Among many arguments are the ideas that nature is crucial to childhood development, social skills, concentration, and a host of other important factors for human life. Children's experiences in the natural world help them to develop their senses in a healthy way throughout childhood. In fact, Louv paraphrased Robin Moore, a North Carolina State University professor, stating that, "Natural settings are essential for healthy child development because they stimulate all the senses and integrate informal play with formal learning" (p. 86).

Louv referenced studies that have taken place in countries including Sweden, Canada, Australia, Denmark, and the U.S. comparing schoolchildren with access to "green" schoolyards versus traditional manufactured schoolyards. Children who had more natural space to explore were found to be more creative, alert, able to concentrate, and better at using their bodies than children in a more traditional playground setting. Louv stated that an increasing number of researchers feel that the loss of natural areas and general detachment from the environment can have enormous implications for

childhood health and development. Spending time in nature is known to reduce stress and Louv stated that new evidence has linked children's disconnection with nature as a factor for intensifying the need for medication to treat mental illness and conditions including ADHD. Exposing children to nature and allowing them to learn in both structured and informal ways is important to their development and overall well-being. By giving children more opportunities to enjoy the environment that surrounds them, we are helping them to grow and learn about the world and, just as importantly, about themselves.

Encouraging children to embrace nature can help address the growing obesity rates in children. In "Pursuing Happiness Through Parks" LaPage (2005) described the apparent connection that lies between people going to parks and their level of happiness. Throughout the article LaPage discusses the notion that participating in park programs leads to a healthier, happier, and more fulfilling life. By instilling the value of the outdoors in today's youth, they may become more active. LaPage believes that due to the emphasis on slimness in America, people who become obese also become unhappy. Replacing overeating with other activities such as going to the park makes a better lifestyle and a happier individual. "Play in natural settings seems to offer special benefits. For one, children are more physically active when they are outside – a boon at a time of sedentary lifestyles and epidemic overweight," according to Howard Frumkin, M.D., now director of the CDC's National Center for Environmental Health (cited in Louv, p.48).

Further, encouraging children to participate in activities in nature could impact their future lifestyle regarding activity and fitness. Natural areas such as parks can provide people with exercise, self-discovery, fulfillment, and other positive indicators. LaPage believes that parks provide opportunities for activity and happiness for people of

all ages. If children learn these values and routines at an early age, they will be more likely to embrace that lifestyle throughout their lives. Children need to be taken out into nature and not allowed to sit in front of the television or play video games all day.

An article in the *Economist* (2007) called “No Child Left Inside” voiced what many people like Louv have suggested that children today are growing up with a nature deficit disorder. The unidentified author writes about the decline in attendance at parks and how alarming the rate of decline is, with 20% less attendance from 1995 to 2005. Concerns of the Sierra Club are mentioned and how this organization depends on people who love parks to lobby for environmental causes. Generally Sierra Club members had a nature experience as a child so the decline in childhood nature experiences raises a concern. The article also discusses the concerns of the National Wildlife Federation (NWF) members who feel a sense of urgency over the decline in youth attendance. The group’s vice president says, “There won't be a conservation movement 30 years from now if there's no love for nature.”

Sobel (1996) wrote about the rise of what many researchers have referred to as ecophobia, which is a fear of the natural world and environmental issues. Sobel is afraid that children are growing up both disconnected with the natural world and connected only to environmental issues through the world of electronic media. As children are learning about the environmental problems today such as global warming, endangered species, and pollution through television and the internet, they are becoming afraid of nature instead of embracing it. These issues can be frightening to young children. Cohen and Horm-Wingerd (1993) believe that children’s misunderstandings and fears about the natural world stem from both a lack of direct contact with the world outside their doors

and attitudes portrayed in the media. Parents and educators need to first teach children about the beauty and wonder of nature firsthand so that they may make a connection to the environment before they are asked to save it. Research has found that positive childhood experiences in nature are the most important factor in developing personal concern for the environment (Palmer, 1993).

Developing a child's love for nature has become the focus of many natural areas, teachers, and parents. Biglearning.com has a summary at the beginning of its "Nature Activities" section that emphasizes the importance of nature for children. It professes the importance of good nature activities as a means of forging a child's bond with the natural world. The site also discusses the importance of nature to children's future education as being the greatest foundation for future study of the natural sciences. By observing nature, children can learn to identify and classify different plants and animals. By encouraging children's curiosity of nature, children may improve their research skills and become comfortable using references such as field guides to aide in their discoveries. The site states that if children progress into more detailed nature studies they may have a chance to use their math skills as well. This website is primarily for parents and encourages them to get their children outdoors exploring the natural world through activities that are presented. To have the greatest impact on children's learning, these activities must adhere to a child's current developmental level. By working with a child on the right level parents and educators truly can use nature as an educational tool.

Developmental Levels of Children

Wilson (1994) noted that the ultimate goal of environmental education is "the development of an environmentally literate and concerned citizenry who will relate to the

natural world in a responsible and caring manner” (p.5). She believed that educators should begin fostering a sensitive and caring attitude toward nature as early as preschool. When developmentally appropriate techniques are used to teach children about the earth, the likelihood of influencing later behaviors and attitudes is improved.

Knowing about child development is important for any educator. Children learn in different ways as they get older and it is vital to understand how children learn at different levels if an educator hopes to teach them anything. For this project it was important to research the developmental levels of children to gain a better understanding of the types of activities that would have the greatest impact on the children completing the booklets.

Cohen (1994) referenced the work of Piaget to understand the different levels of child development. Piaget is responsible for originating the largest body of information related to children’s levels of learning, especially of physical systems. Below is a chart showing Piaget’s levels of development (p.20).

Age	Level	Characteristics
2-7 years	Preoperational	Mental egocentricity, prelogical reasoning
8-11 years	Concrete Operational	Thinking dependent on concrete vs. abstract or hypothetical terms

These levels show a measure of change in the development of children that is nearly unmatched in its level of growth during any similar age range later in life. According to Piaget this period (2-11 years) is when children undergo the most changes in their perceptions of the world and their place in it (Cohen). At these levels, children are

beginning to acquire and refine their sense of relativity. They begin to understand how events are linked and interdependent. In an environmental sense children may begin to understand the connections between plant and animal life and the interactions that compose ecosystems. This is a good time to begin teaching children about the basic interactions of nature such as where animals live, what food they eat, how plants help them and us to survive, and other natural interactions.

Another important facet of childhood development is the moral levels of development. Lewis-Webber (1994) wrote about the importance of both cognitive and moral developmental levels for children and cited both Piaget and Kohlberg. He believed that these two facets were intertwined and had the ability to influence a child's environmental perceptions. According to Lewis-Webber, Kohlberg built upon the levels laid out by Piaget by creating the following series of levels:

1. Preconventional: rules are followed to avoid punishment
2. Conventional: rules are followed in respect for authority
3. Postconventional: Behavior is based on self-chosen principles (p.24)

Moral development in children moves along at about the same ages as cognitive development, but sometimes does not quite keep pace with the development of logical reasoning. For instance, some children will move from prelogical reasoning to more abstract and hypothetical reasoning without moving to conventional moral development. It simply takes some children longer to follow rules due to respect instead of fear. Moral foundations are laid in the preconventional stage and built upon throughout the rest of development. The sooner children participate in activities with an environmental theme the more likely they are to gain environmental ethics (Lewis-Webber). Many

environmental educators believe that it is never too early to start exposing children to nature and teaching them about it in both formal and informal ways.

White (2001) used the developmental levels of children to write suggestions for environmental education. For the early childhood level (ages 3-7 years) the best way to encourage an environmental ethic is to promote relationships with animals and teach about them. At this age he believes anthropomorphizing animals to cultivate understanding and empathy is acceptable. At the early grade school level (ages 8-11 years) allowing exploration and curiosity to flourish is important. Activities that are especially appropriate for this group include scavenger hunts and exploring areas in their own time. At this age plants become more interesting for children especially if they function as animal habitat. White emphasized the need for children of both age groups to be given hands-on interaction with nature where they can play and discover things for themselves. These activities should be somewhat open-ended and allow children to use their natural curiosity and sensory experiences to learn. The best learning will occur in this format because children are discovering things for themselves.

White (2001) and Louv (2005) both wrote that activities that foster sensory experiences in nature could aid in a child's creativity and imagination. Nature is a necessary element for children to fully develop their senses in a healthy way. Louv says that this need is apparent when examining what can happen to the senses of children when they do not have a connection with nature as well as seeing the "sensory magic" of a child who has been exposed to a sensory experience in nature (p.55). Louv quoted Moore as saying, "... Since the natural environment is the principal source of sensory stimulation, freedom to explore and play with the outdoor environment through the

senses in their own space and time is essential for healthy development of an interior life” (p.66). Fostering a child’s curiosity about nature, allowing them to explore, and encouraging empathy can lead to a loving relationship with the earth that will build a great foundation for their environmental ethic. This loving relationship with the earth will likely translate to place attachment for certain areas that children are most accustomed to such as the local beach, park, or other natural area where they like to spend time. This place attachment, along with a developing environmental ethic, can contribute to a child using environmentally responsible behavior in their everyday lives.

Place Attachment and Environmentally Responsible Behavior

Everyone can think of a favorite place that they enjoy visiting more than any other where there are memories, sensations, and enjoyable benefits attached. Perhaps you have a vacation spot that you have grown fond of, or the house where you spent your time as a child, but either way you may feel a certain emotional tie to that place. That emotional tie is called *place attachment* and it “describes a bond that develops when an individual values or identifies with a certain place” (Presley, 2003, p.24). People can highly value their connection to an environment just as they value relationships to peers or hobbies.

In one specific category of meaning called the environmental-landscape dimension, people feel the need to protect the natural landscape. If people feel strongly about a certain place and want to protect it, then they likely will engage in environmentally responsible behavior (ERB) at that place. ERB can range from behaviors as simple and specific as picking up trash and recycling; to general actions such as talking to peers, parents, and other people about environmental issues. The more ERB

people participate in at their personal place of interest, the more likely they are to engage in it more widely throughout their community (Vaske & Kobrin, 2001).

There are two main types of *place attachment* that have been recognized throughout the years called *place dependence* and *place identity*. Place dependence is a functional attachment to a certain area because it provides the amenities necessary to perform a desired activity. This dependence is measured by the physical characteristics of the area and an ongoing relationship with the setting (Vaske & Kobrin, 2001). For example a rock climber may have a place dependence for a nearby park that has many opportunities for climbing, whereas he would not be so dependent on a far away park or one with few climbing areas. Place identity, on the other hand, is an emotional attachment that develops over time. Place dependence can lead to place identity as the person using the area becomes more invested. With place identity the area “may lead to a sense of belonging/purpose that gives meaning to life” (Vaske & Kobrin, 2001, p.17).

Abbott-Chapman (2006) conducted a study of teenagers’ favorite places and why certain ages picked the places they did for recreation or a ‘time out’ to recharge their batteries. She said that, “It is of particular interest that between a quarter and nearly a third of all respondents chose a place in the natural environment as their favorite place, over twice as many as chose a place in town” (p.12). This finding is important for natural resource professionals to take into account because these areas need to be maintained. If more people have a place identity with part of the natural environment, then they also do not want to see it diminished and ruined. Having feelings for a certain place may lead young people to participate in ERB and stewardship throughout their community.

Payton, Fulton, and Anderson (2005) conducted a study on how place attachment influences civic levels of action in community affairs at the Sherburne National Wildlife Refuge. Community involvement is positive for these natural resource managers because it increases the level of understanding, empowerment, and potential economic gain. Joint stewardship is something that the field is striving for and having a better understanding of what makes people want to get more involved in these aspects of the community is beneficial. Their study of place identity, place dependence, and civic action yielded results that indicated a positive relationship between place identity and civic action, but found no significant relationship between place dependence and civic action. For this reason managers of parks and other natural areas should want to provide people with programs, activities, and other positive experiences that will increase patrons' place identity with those natural areas.

Participating in activities in any natural area that contributes to a child's environmental education can lead to place attachment and ERB. Vaske and Kobrin did a study in 2001 on the relationship between place attachment and ERB and suggested that with higher place attachment comes more ERB. They collected data from high school students working in 5-6 week environmental work programs and "aimed to (a) illustrate how place attachment to a local natural resource can affect behaviors in other aspects of a person's life, and (b) suggest an avenue for promoting the development of a more responsible citizenry through environmental education/work programs" (p.17). Youth were surveyed after the program to measure their general actions (e.g. talking to others about environmental issues) and specific actions (e.g. sorting recyclables, etc.) and another survey to measure how much attachment they felt to the area they had been

working in. After analyzing the data it became apparent that a strong connection existed between place attachment, more specifically place identity, and ERB. They also found that more specific actions at the setting of the program led to more ERB within the rest of the community as well.

The study conducted by Vaske and Kobrin (2001) was an important step for environmental educators because it helped establish a possible way to promote environmentally responsible behavior (ERB) that advocates the sustainable or diminished use of natural resources. Vaske and Kobrin stated that “Although educators have sometimes assumed that increasing awareness of the issues will stimulate ERB, the empirical data has repeatedly demonstrated that this assumption is not valid” (p.21). Natural resource professionals should get people involved in their surroundings as a means of changing the way resources are used. The study showed that environmental education/work programs help individuals to develop place identity and make them realize that they can make a positive difference in their community. At HBNR one of the goals is to provide patrons with an appreciation of the natural world so that they will take better care of the environment. By leading programs, volunteer workdays, walks, and answering questions through the SNC hopefully patrons will develop an affinity to HBNR and carry that value of nature into the community.

Other Resources

Environmental education is one way to encourage place identity and ERB in children from a young age. Participating in programs and other activities in natural settings can help to achieve these goals. Part of the reason why my project is to create activity booklets is so that children will become invested in HBNR and develop an

environmental ethic. Programs such as “Project Learning Tree (PLT)” and “Project WILD (PW)” were helpful tools for creating my activity booklets because they are experiment-based activities that have been tested. These programs are full of lesson plans for grades PreK-8 and K-12 respectively. They both contained activities that could be adapted for the purpose of an activity booklet, but mostly they were just a good source of ideas. “Project WET” did not have any pertinent information. The following were the helpful ideas from PLT:

- p.31 – Poet Tree: an activity where they express their feelings for a tree, flower, animal, or other natural object through poetry (grades 3–8)
- p.97 – Adopt a Tree: describe a chosen tree using personal observation and investigation of the tree, identify relationships between their tree and other organisms (grades PreK-8)
- p.175 – Then and Now: describe changes in the community, discuss if the changes were positive or negative, and possibly ways to address negative changes (grades 4-8)
- p.199 – Schoolyard Safari: identify signs of animals living “in the schoolyard” and describe how this can still be a suitable habitat (grades PreK-5)
- p.289 – Name That Tree: Identify several trees based on physical characteristics (grades 2-8)

The following activities from PW were helpful:

- p.11 – Color Crazy: Students see that nature/wildlife comes in many different colors and create a colorful animal that could be real (grades K-6)

- p.19 – Wildlife is Everywhere: learn that humans and animals share environments and that animals are all over. Take 5 min. outside and look for evidence of animals (grades K-12)
- p.39 – What’s That, Habitat?: children identify their own basic needs for food, water, shelter, and space and the way that animals need the same. (grades 2-3)
- p.59 – Wild Words: A journal activity where students can describe their surroundings, record observations in both written and visual forms (grades 4-12, but only because they were making the journals themselves first)
- p.63 – Animal Poetry: Students imagine themselves as animals they see and write poems about it (grades 4-12)
- p.83 – Urban Nature Search: Students realize that different areas are hosts to different life forms. By tallying the types of things they see, describing, and sketching (Grades 4-12)

Activity Booklets

To create activities for the booklets I examined examples of activities that have been used with children in the past to gain a sense of what works best for certain age groups. I used many websites as sources for examples of age-appropriate activities. I used these to help develop my activities based on what is best for HBNR and the education of the children. I searched for activities that can have impact so that children retain their knowledge and enjoy the experience enough to keep an interest in the natural world. Activity booklets from other parks and preserves were especially helpful to see a general overview of what has been done in the past. Below are summaries of each activity booklet resource used and what was helpful in them.

The **Georgia State Parks (GA)** (<http://gastateparks.org/net/content/item.aspx?s=783.0.1.5>) activity booklet was used for ages 6-12 years and split into three groupings within the booklet. For ages 6-7 years, children had to complete seven of fifteen activities, for ages 8-10 years they had to complete ten of twenty-one activities, and for ages 11-12 years they had to complete fourteen of twenty-one activities. This was the best activity booklet that I found while doing my research and had many activities that I used. The ones that provided the most help were:

- p.5 - Water observation activity: an activity where children observe different bodies of water and write down characteristics they observe.
- p.8 – Wildlife observation activity: children write down observations they have made of wild animals
- p.9 – Plant scavenger hunt
- p.11 - Sky activities for day and night including cloud-watching and stargazing.
- p.13 - Recycling activity which shows both natural recycling (e.g. A rotting log, etc) and human recycling efforts
- p.15 – Bird behavior activity (more information in methods)
- P.18 - Word search for ages 8-12 years, but for ages 11-12 years children must highlight different things different colors (plants=green, mammals=yellow, etc)
- p.19 – Volunteer activity (ages 11-12 years) and interview sheet for park staff (ages 8-12 years)

The **New Mexico (NM)** (<http://www.emnrd.state.nm.us/PRD/JuniorRangerMain.htm>) activity booklet (NM) was used for “kids” and did not have specific age groups. To get a badge the children had to complete ten of the fifteen activities. This

activity booklet was different because it included an answer section in the back of the booklet. This idea was considered, but ultimately I decided that having an answer key at the front desk would be enough. Some of the helpful activities from this booklet are listed below.

- p.4 – Senses activity where children use all senses but taste and record what they found.
- p.8-9 - Food web activity explaining consumers, producers, and decomposers and matching the correct animals
- p.12 – Track activity matching up eight different tracks

The **Florida Everglades** (<http://www.nps.gov/ever/forkids/index.htm>) activity booklet was used for “kids” as well and did not have specific age groups assigned. This booklet was confusing in its directions. For children to get a badge they had a specific way that they had to fill out the book with multiple locations. These directions made me realize that easy to follow directions are important. I would not expect a child to understand how to complete that booklet. It did still contain some good activities and ideas...

- p.11 – Draw your own animal with adaptations for where they live. Explain why that adaptation is helpful.
- p.16 - Senses activity (more to come in methods)
- p.18 - Good ideas for extra activities such as exploring a touch table, hiking with your family, and watching a film at the visitor center.

The **Nevada Lovelock Cave** (http://www.nv.blm.gov/Winnemucca/recreation/jr_ranger_book.pdf) activity booklet is for grades K-6 with separate sections for K-3rd

grade and 4th- 6th grade. To get a badge the kids have to complete all the activities in their section as well as extra activities. There were five extra activities such as touring the cave, picking up litter, and hiking a trail; and the children had to complete three and four activities respectively. Some of the helpful activities were:

- K-3rd
 - o Museum treasure hunt- like a scavenger hunt in exhibit hall
 - o Connect the dots
 - o Draw leaf of plant, describe its smells, tell where it was found
 - o Wildlife detective activity- finding evidence of wildlife and checking off what was found
 - o 10x10 easy word search
 - o Digging up the past- archaeologist dig picture with different levels to teach children about the past

- 4th-6th
 - o Fill in the blank questions for exhibit hall
 - o 20x20 word search

The **Cumberland Gap (CG)** (<http://home.nps.gov/cuga/forkids/junior-ranger-program-at-cumberland-gap.htm>) activity booklet was for “kids” of an undetermined age who had to complete “as many activities as you can” to get a badge. This booklet had some good ideas, but it seemed that without actually designating an age or completion requirement children probably did not really take the booklet seriously. Movie trivia from the visitor center movies was one of the good things in this booklet that I did not find in many others.

The **Minnesota (MN)** (http://www.dnr.state.mn.us/parks_recreation/jpn.html)

activity booklets were for “kids” of an undetermined age as well. There were three activity booklets here for the different regions: Pinelands, Hardwoods, and Prairies. To receive a badge for each booklet, children had to complete all activities as well as do three interpretive programs and self-guided walks. These booklets were all very similar in activities and only varied on about two activities for each booklet. The authors only made the necessary changes for the region. Although many activities were good I felt that these booklets were the weakest. Activities were too similar and demanded that the children complete every activity and multiple programs. The kids had too much reading to do. These booklets seemed more appropriate for adults in the way they were constructed although the activities were good for children. The most helpful activities are listed below:

- Pinelands
 - o p.8 - Describe a plant, leaves, flowers/seeds/fruit, smell, where found, can animals use it, and draw it
 - o p.11 - Matching Bird features with various man-made tools
 - o p.19 - Get to know a tree: Draw the tree and answer questions about it
 - o Create a tall tale
 - o p.24-25 - Making a circle and writing all the natural and unnatural things that lie within it and how it affects everything
 - o Describing park changes, what things look as though they’ve been recently changed and by what?
- Hardwoods - p.22-23 - Senses activity

- Prairies
 - o Get to know a wildflower activity instead of a tree
 - o p.22-23 - Habitat activity: Observing three different habitats and answering questions about each.

Some activities that were most helpful were found in multiple activity booklets because they are traditional children's activities and nature activities. They are listed below followed by the organizations that used them.

- Word search: GA (ages 8-12 years), NM, Everglades, Lovelock (both), CG
- Unscramble words: Lovelock (older), CG
- Crossword: Lovelock (older), CG
- Maze: Lovelock (younger), CG
- Journal page: Everglades, Lovelock (older), CG, Minnesota
- Staff interview: GA (ages 8-12 years), CG
- Crack the code: Everglades, CG
- Drawings of plants and/or animals: All booklets
- Scavenger hunt, check off, bingo: All booklets
- Pledge at end: All booklets but GA

Other Online Resources

Many nature activities for children could be found on different websites and many of them were not in the form of activity booklets as seen previously. The following are other websites that were helpful in creating activities and retrieving ideas.

WebRangers (<http://www.webrangers.us/index.cfm>) is an online activity site for kids created by the National Parks Service to reach children everywhere. This site is

interesting to explore and is great for kids and even some adults because it offers many games and activities. Unfortunately it was not helpful for my purposes because most of the activities were not adaptable to an off-line environment. One idea that stood out was about recycling from a game called “Trash Talking” where participants connect the recyclables to the container where the items should be placed.

Environmental Education (EE) Activities (<http://eelink.net/pages/EE+Activities++Correlated+to+National+Learning+Standards>) is a site that provides a list of other valuable EE resources. Most of them, however, are not free to peruse and some need to be ordered. Some links were helpful and led me to the EPA website with kids’ activities and to a school lesson plans site. This EE site would be more helpful to a person or group with money to spend on their materials.

Discovery Education (<http://school.discoveryeducation.com/lessonplans/>) is one of the sites I found at eelink.net above. This site mainly has classroom lessons, but could be a good resource for other programs or to derive ideas. A mammal lesson plan had a crossword puzzle for 5th-6th graders, but that was the only helpful item I found.

Children of the Earth (http://www.childrenoftheearth.com/kids_activities.htm) is a smaller website with ideas both *for* kids and *by* kids. Some good activities could be done in classes and at home, but most were not adaptable for the purpose of these booklets. Some of them were not adaptable because of necessary supplies, but others were not appropriate because they encouraged the collecting of natural materials for projects. People are not allowed to collect materials at the HBNR so those activities did not work. The activity “Sounds and Colors” was the best activity I found on the site and it encourages the use of the senses.

Outdoor Nature Child (<http://www.outdoor-nature-child.com>) is a website for both children and adults that has activities, stories, book reviews, and camp links. The site is put together like a conversation between the reader, writer, and Native Americans and is interesting. Some of the activities that were helpful were a bird watching activity with a Naturalist journal entry, a detailed sketch a plant activity, “Seeing Colors”, and “Species See.” Species See was good, but I don’t know how to best adapt it since it involves several days on one trail for about 15 minutes/day.

Wilderdom (<http://wilderdom.com/games/EnvironmentalActivities.html>) is a nature activity site, but I did not realize initially that it was primarily for adult nature activities. Two activities were most helpful to my project. One was an activity where the participant spent a solo hour in nature. The activity is about finding a place to sit still, relax, and observe surroundings for a period of time, but a shorter length would be necessary for kids. The other idea was a nature scavenger hunt activity.

Reach Out (<http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/arb/meetatree.html>) is website I found as a link from wilderdom.com. Getting to know a tree was the only thing of interest on the site and included bark rubbing, leaf rubbing, drawing, critter homes, animals, and nests.

Big Learning (<http://biglearning.com/treasureoutdoors.htm>) contains different types of nature activities for parents to do with their children. They had a summary statement at the beginning about why parents should encourage their children to get to know nature. Unfortunately, these activities were not appropriate or adaptable for my purpose.

The **Richard Louv** (<http://richardlouv.com/children-nature-resources>) site had good ideas for children’s activities, but most of them were activities that could only be accomplished with a parent. Although most activities could not be adapted, some of the helpful ideas were:

- “We help our kids pay attention during longer hikes by playing 'find ten critters'—mammals, birds, insects, reptiles, snails, other creatures. Finding a critter can also mean discovering footprints, mole holes, and other signs that an animal has passed by or lives there.”
- Nature Journaling
- Getting children to use their senses any way you can

Connecting with Nature (<http://www.connecting-with-nature.net>) is a good resource for anyone wanting to learn more about nature. The site is full of stories, news, activities, projects, and more. It has information on Naturalist activities like keeping a good journal. The “Animal Signs” activity could be useful for a scavenger hunt. Otherwise the resource tells children to weather-watch, stargaze, draw, and do volunteer projects.

The **EPA kids** (<http://www.epa.gov/kids/>) site has links for information and online games, but not much was helpful for activity booklets. The one helpful link I found from this site is the Wisconsin DNR site.

This **DNR** (<http://www.dnr.state.wi.us/org/caer/ce/eeek/teacher/recyclingstudyguide.htm>) site for Wisconsin had a manual for children on recycling and included some activities for them to complete. Many of these activities were more involved than my project required, but some would be appropriate. For grades K-3rd the

two activities that were most appropriate were a maze and a connections activity. For grades 4-8 a word search and crossword puzzle were described. This resource would be helpful for a program on recycling.

Eco-kids (<http://www.ecokids.ca/pub/index.cfm>) is a Canadian website for teachers and students to take advantage of environmental education in stimulating ways. The site is split into a teacher section that contains ideas to use in their lesson plans or classroom, and a student section for children to play games online. Below are the ideas that were beneficial in each.

- Student section
 - o Connections
 - o Identifications
 - o Riddles using math as codes
 - o Quizzes

- Teacher section
 - o Word scrambles
 - o Word searches
 - o Crosswords
 - o Mazes
 - o Writing about an imaginary trip to the arctic
 - o “Adopt a tree” activity uses bark rubs, leaf and tree drawings, a poem/story, and using your senses around it while blindfolded
 - o The “Eye-spy game” could be used as a scavenger hunt and uses descriptions like “something that is wet”

- “Jungle Jumble” is a combination of word search and code that gives you a phrase at the end

Products of the Project

The final product is two “Explorer” activity booklets, “Junior” for ages 5-8 years and “Senior” for ages 9-12 years, which contain activities that are stimulating, educational, and age-appropriate. The “Junior Explorer” booklet contains 12 activities and the children must complete 8 as part of the completion of the booklet. The “Senior Explorer” booklet contains 15 activities and the children must complete 10 as part of the completion of the booklet. The booklets are illustrated in the same manner as the original by using clip-art as well as original illustrations provided by HBNR. They carry the seals of the “Town of Cary” and “Friends of Hemlock Bluffs” as sponsors of the booklets, as well as a mock-up of the badge that the children will receive. These booklets should help children gain an understanding of the natural world and help reinforce environmentally responsible behavior in an enjoyable way. The final version of each booklet can be found at the end of this report.

The children who start off with the “Junior Explorer” booklet can also come back to do the “Senior Explorer” booklet, which will help them get more involved in nature through a longer period of time. To complete both booklets the children must attend one interpretive program offered at HBNR, complete the appropriate number of activities, and walk either Swift Creek trail (for the “Junior Explorer”) or all three trails (for the “Senior Explorer”). The “Senior Explorer” booklet, for ages 9-12 years, includes an additional aspect of helping at a volunteer workday.

These results have been addressed first to provide greater understanding of the methods. The methods and results of this project were intertwined to such an extent that it is difficult to explain one without the other. More results can be seen through reading the “Methods” section below as well as reviewing the activity booklets attached to this report.

Methods

To create these booklets I employed many resources stated previously and greatly examined the original “Junior Explorer” activity booklet. I decided on an appropriate number of activities for each booklet and then used the original booklet to create suitable categories for the activities. There are five categories for activities and they are Stevens Nature Center (SNC); On the Trail (ONT); Wildlife (W); Leaves, Trees, and Other Plant Life (LTP); and Reflection (R). Each of these categories had 2-4 activities (numbered below) and had the same clipart as the original booklet to designate activities. This is important because children must complete at least one activity from each category as part of their total to receive a badge. Activities were created and changed throughout the process based on issues such as format, space, wording, age-appropriateness, and enjoyment. Several authors are cited numerous times in the methods below and include White (2001), Louv (2005), Lewis-Webber (1994), Wilson (1994), and Cohen (1994).

To evaluate the activities I asked my co-workers to examine the activities and provide feedback about the relevancy for HBNR and whether the booklets can help accomplish the goal of reaching the children in an enjoyable, educational way. The person who provided me with the most feedback, suggestions, and alterations was Mark Johns, HBNR’s Program Specialist/Naturalist, who reviewed the booklets multiple times with

me until they were finalized. Other nature programmers including Sharon Becker, Becky Buolo, Megan Gullledge, Miranda Taylor, and Erin Loftus also reviewed the booklets and provided general feedback and suggestions. These reviews took place the first two weeks of March 2009. The questions I asked co-workers were:

1. Are these activities relevant to HBNR?
2. From your experience, do these seem like enjoyable activities for the age group?
3. Do the activities have enough educational merit?
4. Are there any activities that you would remove? Why?
5. Are there any activities that should be altered? How so?

I also asked several children in each age group to go through some of the activities as a way of informally evaluating the credibility of the activities. This pilot testing was done in programs as introductory and conclusion activities as well as outside the programs.

Children tested seven activities. Five of those activities were tested in programs taught by Becky and myself. In each of the programs there were 6-10 children who participated. Four children whose parents I know tested the other two activities outside of class. In total, approximately forty children participated in these activities. Types of questions I asked the children were:

1. Did you enjoy the activity?
2. Do you feel like the activity taught you about nature?

For the few activities done outside of the programs I also asked the parent about the effectiveness of the booklet. The program leader could also answer some of the evaluation questions I posed. This information was helpful because the child may give the parent and/or leader different input than what was given to me and adults are more

likely to remember exactly what the struggles were as their child/participant did the activities. They will likely have been with the child during the activities and may be more helpful in giving details. For this part three parents, Becky, and myself did evaluation.

Types of questions I asked them were:

1. Did the activity seem too easy/hard for the child?
2. Did your child seem to enjoy the activity? Elaborate.
3. Do you feel that this was a good learning experience?

To explain the creation of each activity I will address several aspects of the process:

- Goal: A concise statement about the purpose of the activity.
- Objectives: A list of learning outcomes for the participant.
- Source: Where the activity originated.
- Justification: Support for the inclusion of the activity.
- Adaptations: How the activity was altered from its original state.
- Evaluation: A summary of what was said about the activity.

JUNIOR EXPLORER (Found on p.65-69)

Name your three favorite animals (SNC#1)

- Goal: To learn about wild animals in HBNR through exploring the dioramas of the exhibit hall.
- Objectives:

At the end of this activity children will be able to:

1. Identify wild animals that live in HBNR.
2. Recognize the size and appearance of animals in HBNR.
3. Appreciate the diversity of animals and habitats in HBNR.

- Justification: This idea came from reading White, Wilson, and Lewis-Webber. White stated that cultivating relationships with animals is important for children. This activity is one way to cultivate those relationships by allowing children to see what these animals look like in the wild. Wilson said to “Encourage curiosity. Let the children find their own items of interest” (p.73). By giving them a choice of animals to focus their attention on, we are allowing them to be curious about all of the animals. Lewis-Webber wrote that children in the preoperational stage want to verbally label objects and creatures in their environment. This activity helps put a “face to a name”.
- Adaptations: When I first wrote the activity I thought that it would be appropriate for the children to write one fact about each animal they chose. One of my coworkers suggested that I narrow down a little more to save space and make it more interesting for the children. It seems to be better now.
- Additional Information: I like that the activity allows them to explore and talk about what they liked best. I left this open-ended so they explore more on their own.
- Evaluation: Other than the suggestion to narrow down the question my coworkers liked this activity.

Track ID (SNC#2)

- Goal: To learn about tracks through hands-on use of the track table in the exhibit hall.
- Objectives:
At the end of this activity children will be able to:

1. Differentiate between the tracks of four different animals (Deer, Fox, Opossum, and Raccoon) at HBNR.
 2. Label the tracks of the four animals.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Adaptations: I decided to leave this activity in tact.
 - Justification: Lewis-Webber, as well as other authors previously mentioned, stated the importance for hands-on activities. This activity gets children using the track table to see what real animal tracks look like.
 - Additional Information: The track table is our most popular feature in the exhibit hall. Children love to play with it and learn about animal tracks.
 - Evaluation: Because this activity has not been changed from the original booklet and the track table is so popular with children, I did not formally evaluate this activity.

Sound and Color (ONT#1)

- Goal: To learn about the sounds and colors of the park through use of the senses.
- Objectives:
At the end of this activity children will be able to:
 1. Describe sounds in HBNR.
 2. Assess the multitude of sounds and colors of nature.
 3. Appreciate the details of the surrounding environment.
- Source: The idea came from Children of the Earth’s “Sounds and Colors” activity meant for ages 3 years and up.

- Justification: Authors such as Louv, White, Wilson, and Lewis-Webber would all approve because it focuses on the senses and children's natural curiosity.
- Adaptations: Before it was just a game that kids could play with their parents. I adapted it so that the instructions were a little different and asked actual questions about what was heard and seen.
- Evaluation: Initially I had the children listening for ten sounds and then picking five to write down. Our Program Specialist, Mark, wanted me to edit the activity so that children only had to listen for five sounds and write them all down. He thought they might get confused. Kids that I tested this activity on really enjoyed it and just wanted to stay outside longer.

Explorer Bingo (ONT#2)

- Goal: To learn about the natural and human-made objects which make up HBNR by using a game to search for them.
- Objectives:

At the end of this activity children will be able to:

 1. Recognize various natural and human-made objects in HBNR.
 2. Identify and label objects in nature.
- Source: This activity was in the original "Junior Explorer" booklet.
- Justification: Lewis-Webber stated the importance for children in the preoperational stage to use symbols to represent real objects in order to help them in the attainment of language. All of the objects in this activity are labeled and will help children identify objects in HBNR. White, Cohen, and Lewis-Webber

- expressed a necessity for active learning and providing more interaction with nature. Activities that employ a scavenger hunt strategy accomplish that goal.
- Adaptations: I decided to leave this activity nearly the same. The only change that was made was changing one of the clipart pictures to more accurately reflect the birdfeeders we have at HBNR.
 - Evaluation: All the activity booklets researched had some kind of scavenger hunt type activity and they are popular with kids. Therefore, I did not evaluate this particular activity.

Habitat Hunt (ONT#3)

- Goal: To learn the relationship between animals and their habitat by comparing it to human necessities.
- Objectives:
At the end of this activity children will be able to:
 1. Relate their own necessities of water, food, and shelter at home to the same necessities for animals in their habitat.
 2. Categorize which factors in an animal's habitat correspond to their needs.
- Source: The idea came from PW's "What's That, Habitat?" activity for 7-8 year olds.
- Justification: PW used this activity for about the same age group and it was altered to make sure the younger children could also understand. White's ideas support this activity because it is showing children their relationship with animals and the similarities they share. The idea of relativity and the interrelationships

between animals and their habitat is something that Cohen and Lewis-Webber believed is important to this age group. Lewis-Webber believed that while children may not develop a full understanding of these relationships yet, it is important to lay that foundation.

- Adaptations: Instead of having children draw their homes and animal homes and then write out comparisons, this activity was turned into a matching activity. The necessities are the same except I did not include space as a necessity because that is harder for the 5-6 year olds to comprehend.
- Evaluation: This activity received positive feedback from my co-workers who believed that these relationships between human and animal homes are important for children to understand.

Bird Behavior (W#1)

- Goal: To learn about the behaviors of birds in HBNR through observation.
- Objectives:
 - At the end of this activity children will be able to:
 1. Identify three birds that live in HBNR.
 2. Recognize the behaviors of local birds.
 3. Examine the characteristics of birds.
- Source: Half of the activity came from the GA activity booklet on p.15.
- Justification: White wants children to do activities that involve animals as a way of connecting them to nature. Lewis-Webber said that children should be using observation and labeling to aide in their learning. Names of birds and details about what they do and where they live are interesting to young children. Bird

watching is also popular across the country and was on many activity lists, such as Outdoor Nature Child.

- Adaptations: I left out the habitat checklist from the original activity because the children will only be performing this activity at HBNR and possibly their home. I also took out a few of the bird behaviors that are not seen at HBNR. Since they will be watching the birds already I added a bird identification part where the children have pictures of three common birds and they have to circle one that they find.
- Evaluation: Mark wanted a few edits for this activity. We took out the swimming behavior because that is not frequently seen at HBNR. The third bird was originally a Northern Cardinal, but we wanted to change it to an American Goldfinch because they are more dominant at HBNR. Once those edits were made this activity was a popular one with Mark and my coworkers.

Habitat Match (W#2)

- Goal: To learn where animals make their homes in HBNR.
- Objectives:

At the end of this activity children will be able to:

 1. Identify wild animals that live in HBNR.
 2. Distinguish the habitats of different animals.
 3. Appreciate the diversity of animals and habitats in HBNR.
- Source: This activity was in the original “Junior Explorer” booklet.
- Justification: White, Lewis-Webber, and Cohen have ideas that would support the inclusion of this activity as mentioned previously in the “Habitat Hunt” activity.

Lewis-Webber would approve of labeling the pictures as a way of reinforcing children's attainment of language by using symbols.

- Adaptations: I left this activity mostly the same as it was originally. The only change was that I labeled the clipart for the reasons above.
- Evaluation: Because this activity has not been changed from the original, I did not formally evaluate this activity.

Draw an Animal (W#3)

- Goal: To learn about animals and their characteristics through drawing.
- Objectives:

At the end of this activity children will be able to:

1. Identify wild animals that live in HBNR.
2. Illustrate the characteristics of an animal.
3. Examine the details that make animals different from one another.

- Source: This activity was in the original "Junior Explorer" booklet.
- Justification: Different drawing activities, nature journal pages, and free space were in every activity book that I looked at and on most of the websites as well.

Children can pick a subject that interests them and draw it. According to Wilson it is important to "let the children find their own items of interest"(p.73) to encourage curiosity and learning. This activity provides children with real interaction with nature as Cohen, Lewis-Webber, and Louv suggest; and obviously establishes a relationship with animals as White suggests.

- Adaptations: The only change I made was to give a full page for the drawing instead of $\frac{1}{4}$ of a page like before. I figured the more space a child had to draw, the more likely they were to draw more detail.
- Evaluation: Because this activity has not been changed much from the original and drawing activities were found so frequently, I did not formally evaluate this activity.

On the Trail (LTP#1)

- Goal: To learn about the variety of trees in HBNR while hunting for four of them.
- Objectives:

At the end of this activity children will be able to:

1. Identify four trees that live in HBNR.
 2. Differentiate between trees by examining their leaves.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Justification: This activity is like a small tree scavenger hunt and employs active learning. It has much of the same justification as the “Explorer Bingo” activity because of the way it uses symbols, labels, and active learning. This was also a valuable activity in the original booklet. The Hemlock trees are the reason HBNR exists so it is important for children to recognize them.
 - Adaptations: This activity was kept the same except I allowed it to take up a whole page instead of $\frac{1}{3}$ of a page so that the clip art could be larger and easier for children to examine.
 - Evaluation: Because this activity has not been changed from the original, I did not formally evaluate this activity.

My Perfect Plant (LTP#2)

- Goal: To learn about a plant in HBNR through examination, drawing, and description.

- Objectives:

At the end of this activity children will be able to:

1. Examine and describe the characteristics of the plant they chose from HBNR.
 2. Differentiate plants based on their characteristics.
- Source: The idea for this activity came from sources including the original “Junior Explorer” activity booklet, MN Pinelands activity booklet p.8-9 and 19, Wilderdom’s “Get to know a tree”, Eco-kids’ “Adopt a tree”, Outdoor Nature Child’s “Sketch a plant”, and Lovelock activity booklet’s “Nature Lover”.
 - Justification: This type of activity was found in many places as evidenced by the source of the idea above. This activity utilizes the ideas of Wilson, Cohen, Louv, and Lewis-Webber by employing active learning and allowing children to pick their own subject of interest.
 - Adaptations: This activity is simply inspired by the activities listed above. No adaptations were specifically made until after evaluation.
 - Additional Information: The plant drawing activity in the original booklet had children drawing three different leaves and identifying all of them with guides in the visitor center. I believe that would be too much for a younger child to do.
 - Evaluation: Originally the first question after the drawing was “What does it smell like?” Mark did not believe that this question went along with the activity as a

whole and we changed it to “What does it look like?” Other than this alteration my coworkers liked the activity better now than the previous plant activity that was included.

Draw a Picture (to describe all your feelings about nature) (R#1)

- Goal: To reflect on the knowledge attained through drawing.
- Objectives:

At the end of this activity children will be able to:

1. Appraise their feelings about HBNR.
 2. Examine what they learned about nature through knowledge of HBNR.
 3. Illustrate their feelings and new knowledge in a creative way.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Justification: I left this activity in the booklet because I believe that reflection is an important element to learning and doing it in creative ways can be important for many children. Journal pages were in the Everglades, Lovelock (older), CG, and Minnesota activity booklets. White, Cohen, and Wilson provide support for the inclusion of this activity.
 - Adaptations: The only change that was made was to increase the space where the children could draw so it was a full page instead of half a page. Once again, I just did not want to restrict them that way.
 - Evaluation: Because this activity has not been changed much from the original and drawing activities were found so frequently, I did not formally evaluate this activity.

Write a Story (R#2)

- Goal: To reflect on experiences, feelings, and knowledge of HBNR through creative writing.
- Objectives:

At the end of this activity children will be able to:

 1. Examine knowledge they have gained at HBNR.
 2. Identify plants and animals that they discovered.
 3. Describe their experiences in a fun and creative way.
- Source: On the Eco-kids website there was an activity where children wrote about an imaginary trip to the Arctic. I thought the idea was good, but wanted it to be more of a fictional reflection of what they actually encountered or learned at HBNR.
- Justification: Lewis-Webber believed that it is important for children to verbally label things surrounding them to enhance their language skills. Cohen emphasized the importance of allowing children to feel a sense of ownership over areas and knowledge to encourage a love of nature. Louv and White would approve of this activity because it encourages the use of senses, creativity, and imagination.
- Adaptations: No adaptations were made because I did something completely different than the original activity.
- Evaluation: My coworkers think that it is a fine idea and I even got the comment that they like to do that in their programs sometimes. When this activity was tested on a group of 7-8 year olds they seemed to enjoy it because they readily came up with stories and wanted to share them with the class and me.

SENIOR EXPLORER (Found on p.70-75)

Track ID (SNC#1)

- Goal: To learn about tracks through hands-on use of the track table in the exhibit hall.

- Objectives:

At the end of this activity children will be able to:

1. Differentiate between the tracks of four different animals (Deer, Fox, Opossum, and Raccoon) at HBNR.
 2. Label the tracks of the four animals.
 3. Describe the similarities between a human footprint and animal tracks.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Justification: Lewis-Webber, as well as other authors previously mentioned, stated the importance for hands-on activities. This activity gets children using the track table to see what real animal tracks would look like as well as creating their own track.
 - Adaptations: I added an extra section to this activity for the older group. Once they complete the identification of the four animal tracks they must make a track of their feet and compare it to the animal tracks.
 - Additional Information: The track table is our most popular feature in the exhibit hall. Children love to play with it and learn about animal tracks.
 - Evaluation: Because this activity has not been changed from the original booklet and the track table is so popular with children, I did not formally evaluate this activity.

Captivating Crossword (SNC#2)

- Goal: To gain knowledge from the Exhibit hall through completing a crossword.
- Objectives:

At the end of this activity children will be able to:

1. Recall facts from the Exhibit hall about HBNR.
 2. Identify and explain the objects in the display cases.
- Source: The idea for this activity came from Lovelock and CG activity booklets, EPA kids, Discovery Education, and Eco-kids.
 - Justification: This activity is a way for children to learn information presented in the exhibit hall. It encourages them to read the displays to find the answers and hopefully they will read more than just the necessary parts. This activity will also help advance language skills as the children learn new vocabulary. Crosswords are found in the sources stated above and are used frequently as games in media such as newspapers, and as a learning tool in schools.
 - Adaptations: Twelve clues was the average length ranging up to sixteen clues. I gave fourteen clues to get at least one question from each display.
 - Evaluation: One of the parents, as well as Mark, had a problem with the wording of a couple of the clues. Those have been fixed for the final draft. Kids enjoyed this activity. They seemed happy going through SNC finding the answers and their parents said that the children had liked it as well.

Time Flies! (SNC#3)

- Goal: To learn about the history of HBNR and people's past impacts on it.
- Objectives:

At the end of this activity children will be able to:

1. Describe the origin of the bluffs.
 2. Discuss people who impacted HBNR in the past.
 3. Examine the trails for signs of previous inhabitants and structures.
 4. Identify the name of the founder of HBNR, Colonel Stevens.
- Source: Idea came from the “Then and now” activity in PLT and a few of the activities in the GA activity booklet regarding history.
 - Justification: It is important for children to understand some of the history of an area to fully grasp why it is special. This activity is especially important for children who live in Cary because it is part of their history as well. PLT had a similar activity recommended for children grades 4-8, which is the same age group that will have this booklet. This activity will also help children understand the impact of people on the land.
 - Adaptations: Although the idea came from previous activities, the activity in this booklet was made using the Timeline wall of the exhibit hall. Only slight wording changes were necessary after being reviewed.
 - Evaluation: Other than the few mistakes with wording this activity was approved by my coworkers.

Scavenger Hunt (ONT#1)

- Goal: To learn about objects in HBNR by using the senses of sight and touch on the trail.
- Objectives:
At the end of this activity children will be able to:

1. Differentiate between various objects on the trail based on how they feel.
 2. Describe natural objects at HBNR.
 3. Appreciate the plethora of characteristics nature has to offer.
- Source: This activity came from the Eco-kids “Eye-spy... in the Woods” game.
 - Justification: Almost all sources I looked at had some form of a scavenger hunt to get children immersed in nature. Ideas similar to this were also in GA activity booklet p.8-9 and Connecting with Nature’s “Animal signs.” White, Cohen, and Lewis-Webber expressed a necessity for active learning and providing more interaction with nature. Activities that employ a scavenger hunt strategy accomplish that goal. Wilson wrote that learning by discovering and touching was better for learning than any lecture could be for children.
 - Adaptations: On Eco-kids this activity was used as a game to be played with an entire class. They would use the descriptors given and play it with the traditional rules of “eye-spy,” having other children guess what they had found. I altered the activity by turning it into a solo scavenger hunt in which the child writes down what he or she found. I also left out or altered several of the descriptors for space and ease.
 - Evaluation: This activity was well received by everyone who read it or participated in it. The six kids in my program who completed the activity really enjoyed it because they got to explore and discover things for themselves such as quartz, trout lilies, and sweet gum seedpods.

Nature’s recyclers (ONT#2)

- Goal: To learn about the importance of recycling through searching for natural examples and recycling at home.

- Objectives:

At the end of this activity children will be able to:

1. Identify four ways that nature reuses and recycles old items.
2. Associate the way that nature and humans recycle.

- Source: This activity is from the GA activity booklet on p.13.

- Justification: This recycling activity was perfect for this booklet in my opinion.

Recycling is important for HBNR as a principle and important in nature as well.

This activity connects how nature recycles with how people recycle. This activity is part scavenger hunt to try to find natural recyclers and part hands-on activity.

Cohen, Lewis-Webber, and Louv support interactive learning like this.

Encouraging environmentally responsible behavior (ERB) is supported by Vaske and Kobrin (2001).

- Adaptations: In the original activity only three natural recyclers were included and they did not show pictures of them, but wanted to children to draw them when they were found. I added the snag and made all of the natural recyclers have clipart. I did not want the children to misunderstand what they were looking for and get confused.

- Evaluation: Two of my coworkers thought that a sentence that I wrote explaining natural recyclers giving new life was confusing, so I removed it. Other than that everyone thought it was a good way of connecting natural recycling to human recycling.

Use your Senses! (ONT#3)

- Goal: To learn about nature through the use of four senses.

- Objectives:

At the end of this activity children will be able to:

1. Discuss what happens in nature by describing what they heard, felt, saw, and smelled.
 2. Examine outdoor environments by utilizing their senses.
 3. Appreciate the sensory environment that nature has to offer.
- Source: Idea came from NM (p.4) and MN Hardwoods (p.22-23) activity booklets.
 - Justification: Louv, White, Wilson, and Lewis-Webber all support activities involving the use of the senses. Development of the senses is an important part of childhood and nature can provide a great sensory environment.
 - Adaptations: Both of the booklets utilized the same four senses because it is too dangerous for a curious child to go around tasting things as well. The MN activity booklet had children go to three different locations and do the activity. The NM booklet was more specific when it came to the “touch” section and gave descriptors that the children had to find, like in my scavenger hunt activity. I did not do either of these things, but the only real adaptation was to design the format to fit in the space I had designated for the activity.
 - Evaluation: Everyone enjoyed this activity! It is good that the children are doing these booklets mostly on their own, however, because they enjoyed the activity

but were not able to concentrate as much in a program setting. They were all trying to share their observations at once.

One Little Plant, Tree Drawings, and Identify it! (LTP#1-3)

For these three activities I will talk about them as a whole because that is how I created them. The ideas contributed to all three activities and it would be insensible and repetitive to address them separately. Although these activities do not have to be done together, “Identify it!” can only be completed if one of the first two activities were completed beforehand. All three of these activities have the same objectives unless noted.

- Goal: To learn about plant life in HBNR through examination, drawing, and descriptions.
- Objectives:

At the end of these activities children will be able to:

1. Examine and describe the characteristics of the plant they chose from HBNR.
 2. Differentiate plants based on their characteristics.
 3. Identify their chosen plant or tree (“Identify it” activity).
 4. Utilize a field guide or website to identify plant life (“Identify it” activity).
- Source: The ideas came from the original “Junior Explorer” activity booklet, MN Pinelands activity booklet p.8-9 and 19, Wilderdom’s “Get to know a tree”, Eco-kids’ “Adopt a Tree”, and Outdoor Nature Child’s “Sketch a plant”.

- Justification: Journal pages, drawings, and identifications were in almost every activity booklet and website I saw. This is a way for children to pick a plant/tree that interests them and use it for an activity as Wilson suggests. Letting them pick their own will encourage curiosity and learning. These activities provide children with real interaction with nature as Cohen, White, Lewis-Webber, and Louv recommend.
- Additional Information: I used the above sources to create three different activities that get kids out in nature searching for different plants and identifying their differences.
- Adaptations: The “Tree Drawings” and “Identify it” activities did not have real adaptations because they did not come from one particular source. The “One Little Plant” activity was primarily taken from the MN Pinelands activity booklet on p.8. The wording was changed, but the basic questions remained largely the same. The only question I left out was about how animals could use the plant because I wanted to keep the questions based on observation and not assumption.
- Evaluation: Mark and my other coworkers liked this activity and the idea of having a second part in which children could identify what they found. “Identify it” counts as a new activity and may help children fulfill the activity requirement. Because this activity was similar to one in the original booklet and has been used frequently in environmental education, children did not evaluate the activity.

Curious Creatures (W#1)

- Goal: To learn about creatures in HBNR by seeking out wildlife and evidence of it.

- Objectives:

At the end of this activity children will be able to:

1. Identify where animals have been in HBNR.
2. Describe what animals leave behind that proves they were there.
3. Illustrate what animals and their signs look like.
4. Accept that just because you have not seen an animal in HBNR does not mean it is not there.

- Source: Idea came from Louv's website and book.
- Justification: This activity involves active learning and exploring possible animal habitat as White would suggest. Children are able to choose their own items of interest and, as Wilson stated, that encourages more learning through discovery. Lewis-Webber would approve of the way that this activity promotes an interrelatedness of objects because the children are searching for both animals and the signs that they are there.
- Adaptations: A parent shared this activity with Louv as a game in which children pointed out ten things that they saw. I adapted it slightly for the booklet by creating nine boxes that the children could use to either describe or draw what they found.
- Evaluation: Children in one of my programs did this activity while we were on the trail and they enjoyed it. It forced them to look harder than if I was pointing everything out to them. They liked it because they found items like squirrel nests, chewed nuts, and different bugs on their own.

Hemlock Bluffs at Night (W#2)

- Goal: To learn about nocturnal animals at HBNR.
- Objectives:

At the end of this activity children will be able to:

1. Identify animals that are mostly active at night.
 2. Accept that there are different animals roaming HBNR at night than in the day.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Justification: Word scrambles were used in the Lovelock activity booklet, CG activity booklet, and Eco-kids. Matching activities were also used in many booklets and activity sites. This activity gives symbols and labels for the nocturnal animals. Although Lewis-Webber had specifically identified symbols as helping children in the preoperational stage, it should also help older children with their language attainment.
 - Adaptations: The old activity only had the word scrambles and a clipart of binoculars, but it did not even have a word bank. Mark had wanted at least a word bank for the children to use. Instead of using a bank, however, I added labeled clipart of the animals so that children could see what they looked like as well.
 - Evaluation: Because this activity has not been changed much from the original booklet and both word scramble and matching activities are popular with children, I did not formally evaluate this activity.

Draw an animal (W#3)

- This activity has the same methods as the “Drawing an animal” activity in the “Junior Explorer” activity booklet above.

Wildlife Wordsearch (W#4)

- Goal: To become familiar with the names of wildlife found in HBNR.

- Objectives:

At the end of this activity children will be able to:

1. Recognize the names of many animals in HBNR.
2. Name some of the animals that live in HBNR.

- Source: This activity was in the original “Junior Explorer” booklet.
- Justification: Lewis-Webber believed that the earlier children participated in activities with environmental themes, the more likely they were to have an environmental ethic. He also acknowledges that children love to know the names of animals and this activity allows children to begin hearing the names of animals in HBNR. Wordsearches were used in GA, NM, Everglades, Lovelock, and CG activity booklets; as well as the EPA kids and Eco-kids websites. For its size it is too difficult for younger children.
- Adaptations: No adaptations were necessary for this activity.
- Additional Information: Children in our programs usually enjoy doing a wordsearch as an introductory activity because it is like a game and they are learning terminology.
- Evaluation: Because this activity has not been changed from the original booklet and wordsearches are used frequently for children, I did not formally evaluate this activity.

Write a poem (R#1)

- Goal: To reflect on experiences, feelings, and knowledge of HBNR through poetry.

- Objectives:

At the end of this activity children will be able to:

1. Examine the observations they made at HBNR.
 2. Identify a plant or animal that they discovered.
 3. Describe their experience in a fun and creative way.
- Source: This activity was in the original “Junior Explorer” booklet.
 - Justification: Both Project Learning Tree and Project Wild had a poetry activity for this age group. This is a good way for children to reflect on the things that they have seen and experienced in HBNR.
 - Adaptations: This activity was left intact.
 - Evaluation: Because this activity has not been changed from the original booklet, I did not formally evaluate this activity.

Comparing Sounds (R#2)

- Goal: To learn about the different soundscapes of HBNR and home environments and compare them.

- Objectives:

At the end of this activity children will be able to:

1. Differentiate between the soundscape of HBNR and their own backyard.
2. Describe sounds that occur in nature as well as at home.
3. Compare and contrast natural and manmade sounds.

- Source: Everglades activity booklet p.16.
- Justification: White and Louv both emphasized the need for sensory experiences. This activity should help with developing their sense of sound and get them to realize that nature is everywhere, not just at parks. This should also help children reflect on the differences between HBNR and their home environment. It should show children a sense of relativity and interconnectedness between nature and home. Cohen stated that increased understanding of relativity is a characteristic of developing children around this age.
- Adaptations: The activity is mostly the same other than the format. The only real differences are that I called them “man-made sounds” instead of “human-made sounds” and I left out a question about protecting the soundscape which I thought was too confusing. Instead, I added a question about which sounds they enjoyed more.
- Evaluation: Mark and my coworkers thought that this was a good activity because they can hear the differences, but more importantly they can hear the similarities. This will help them realize that nature really is everywhere and they should enjoy it where they find it. One 11 year old girl participated in the activity and said that she never realized before how many natural sounds there were in her backyard.

Volunteer Workday

- Goal: To learn about the maintenance and care of HBNR by participating in volunteer activities.
- Objectives:
At the end of this activity children will be able to:

1. Describe some of the work required to keep HBNR functional.
 2. Apply practices they learn to other natural areas.
 3. Support natural areas and people who work in them.
 4. Operate tools such as wheelbarrows, hammers, rakes, and clippers.
- Source: The idea came primarily from Vaske and Kobrin's (2001) study.
Volunteer work is also a requirement for this age group in the GA activity booklet. The format of the Volunteer completion sheet follows the same format as the Program completion sheet.
 - Justification: Vaske and Kobrin's (2001) study, as reviewed on p.18, proved that youth who complete volunteer activities are more likely to engage in ERB in other areas of their lives. This study was performed on high school students, but I believe that it would be just as, if not more, effective for younger children. Lewis-Webber stated that the earlier children participate in environmental activities the more likely they are to grow up with an environmental ethic as part of their moral foundation. This foundation of moral sense starts being laid in the pre-conventional stage with children who are younger than those participating in the "Senior Explorer" program. It is for this reason that I believe it is legitimate to trust that this age group would also increase their ERB by completing volunteer work in HBNR. These activities also provide children with hands-on interaction with nature as Cohen, White, and Louv recommend.
 - Adaptations: There were only adaptations to make the completion sheet applicable to a volunteer workday. There are prompts for what was done during the workday and why that activity is important for maintaining HBNR.

- Evaluation: My coworkers, including Mark, thought that this was a great idea because it will help the older children develop an affinity for our center and cultivate ERB throughout the community.

Discussion

During this project I have learned more about environmental education. I wanted to work on this project because I believe that children are our best hope for the betterment of the environment. They truly are the future of the world and I believe that if we teach them to love nature and experience it the way it used to be experienced then the natural world might have a chance. I am afraid that if we do not address this problem that a large portion of children are going to become ecophobic and not try to save our resources in the future. I hope to do my part to provide children with the wonder of nature whether it is through programs I teach, keeping HBNR clean, or creating these activity booklets. This is the true purpose of the project, to allow children to have semi-structured experiences in nature on their own timeframe. I want them to be able to discover for themselves all the majesty of nature and I want them to love HBNR as much as I do so that they will help take care of it, and other natural areas, in the future. Restructuring the “Explorer” program also kept the SNC activities in line with the updated exhibits as well as made the booklets more age-appropriate by splitting the program into two segments.

In general, I knew a good amount about environmental education before this project from interpretation classes I have taken and from working at Hemlock Bluffs as a Nature Programmer. However, children’s activity booklets were a new medium for me. Making the activities stimulating, age appropriate, and understandable is important. This booklet is not a program with a teacher present to answer questions if they are confused.

Therefore, the directions have to be written in a way that makes sense to your audience. Age appropriateness is important for this type of program. If activities are not within an appropriate developmental range they will not accomplish anything. The activities must be interesting and stimulating enough to keep children involved because they are not completed in a classroom setting that is designed to keep the children on task.

Creating the actual activity booklets went well and researching examples was one of my favorite parts. I really enjoyed looking at activity booklets from parks and preserves across the country. These were the most helpful and exciting resources available to me and made me wish that I was a kid again so that I could complete all of them and start collecting patches! It was also great to see how many websites are dedicated to returning children to nature in one way or another. There were even websites about getting more adults back out in nature which I thought was amazing.

The biggest challenge of this project was trying to get the activities tested by children in a timely fashion. My supervisors at Hemlock Bluffs were hesitant to allow me to pass out anything that was not completely finalized so I was unable to pass out the booklets as a whole. To test I ended up almost exclusively doing the activities in programs I was teaching, unless I had a friend with a child in the appropriate age range. The other challenge was using the Microsoft software to make the activity booklets because it was so fickle, but that was not an important challenge.

Overall I am pleased with how my products look!

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HEMLOCK BLUFFS
NATURE PRESERVE

JUNIOR EXPLORER ACTIVITY BOOKLET

(5-8 years old)



Originally created by
Mary Burroughs (2007)

Updated by Deanna Stewart (2009)



2



Welcome to the Hemlock Bluffs Nature Preserve Junior Explorer Program!

In completing this program, you will learn about nature here at the preserve. There are a bunch of fun activities for you. We believe the more you know about nature, the more you will want to help us conserve it.

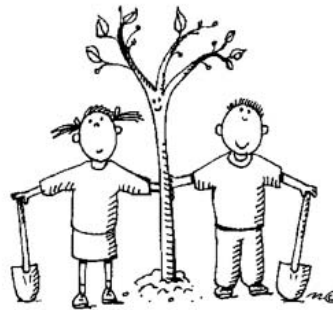


WHY IS HEMLOCK BLUFFS SPECIAL?

Hemlock Bluffs is home to Eastern Hemlock trees, which are normally only found in the Western part of North Carolina. These hemlocks live along the bluffs (small cliffs) which face north and have cooler temperatures. Below the bluffs, Swift Creek creates a moist environment that also favors the hemlocks.

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CONGRATULATIONS on completing Hemlock Bluffs' Junior Explorer Program! We hope that you have learned a lot and had fun completing the activities in this booklet. You are now a Junior Explorer! Take your completed booklet to the front desk in the Stevens Nature Center to receive your prize. Be sure to write your name in the Junior Explorer log and tell your friends about the program!



PROGRAM COMPLETION SHEET

Attend a Stevens Nature Center Program

Date of Program: ___/___/___



Name of Instructor: _____

After attending this program, I learned:

I can use this information when I:

Instructor's Signature: _____

SCHOLARSHIP OPPORTUNITIES FOR NATURE PROGRAMS AND CAMPS!

The Friends of Hemlock Bluffs are now accepting applications for scholarships. Scholarship winners will be awarded a \$50 credit to use toward their registration for one or more nature programs at the Stevens Nature Center.

Pick up your application at the Stevens Nature Center or call (919) 387-5980 for more information.

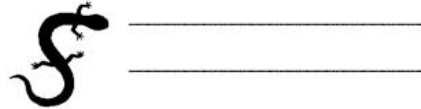
This Book belongs to:

I am _____ years old. I live in _____

County, in the State of _____,

and go to _____ School.

My address is: _____



My hobbies are: _____

I like nature because:



HOW TO BECOME A

JUNIOR EXPLORER

1. Attend a Stevens Nature Center Program and fill out the Program Completion sheet in the back of this booklet.
2. Complete 8 activities in the Junior Explorer Activity Booklet, including at least one from each category below.
3. Hike Swift Creek Loop Trail and sign here afterwards.

KEY TO CATEGORIES

- Around the Stevens Nature Center
- On the Trails
- Wildlife
- Leaves, Trees, and Other Plant Life
- Reflection

THE JUNIOR EXPLORER PLEDGE




As a Junior Explorer, I promise to help protect and care for Hemlock Bluffs Nature Preserve. I will continue exploring outside in nature, and I will tell my family and friends about the cool things I learned.

Signed: _____

Handwriting practice lines with a vertical red margin line on the left. There are three blue dots placed on the lines: one on the top line, one on the middle line, and one on the bottom line.

TAKE A WALK AROUND THE STEVENS NATURE CENTER EXHIBIT HALL

As you explore the exhibit hall pay close attention to the animals and read about them!

 Name your three favorite animals from the exhibit hall and something you learned.

1) _____

2) _____

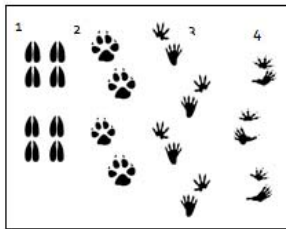
3) _____

Something I learned is: _____



 TRACK ID

Can you identify the animals that made these tracks? Write the animal name beside the number of their tracks. Check out the track table in the front of the nature center lobby. You can even make these tracks in the sand!



1. _____

2. _____

3. _____

4. _____

6 ON THE TRAILS

GET READY FOR YOUR HIKE . . .

In order to keep our nature preserve looking good for our visitors, and to make sure all the plants and animals have a nice place to live, we have some rules.

1. Stay on the Trail
2. Don't Litter
3. Leave Nature in the Preserve (No Collecting)



Sound and Color

Sit or Lie down on a bench on the trail. Close your eyes and put up a finger every time you hear a natural sound. Listen until you hear at least 5 sounds and then write down what you heard.

1) _____

2) _____

3) _____

4) _____


5) _____



Open your eyes and don't move. How many different colors do you see?

What color do you see most often?

Adapted from an activity from Children's Health.com


 Write a Story

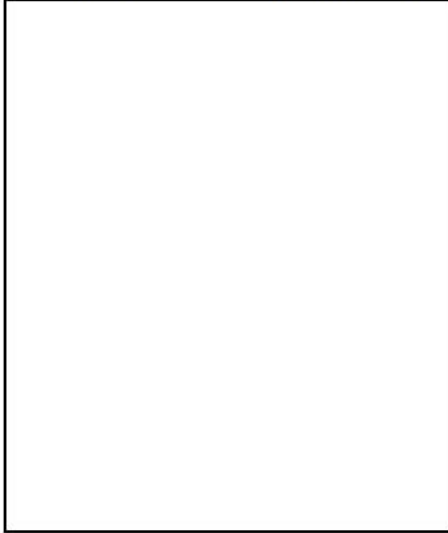
Think about all the things that you saw at Hemlock Bluffs and make up a story about them. Use some of what you saw around the preserve in the story including plants and animals. You may continue the story on the next page if you need more space!

Handwriting practice lines with a vertical red margin line on the left. There are three blue dots placed on the lines: one on the top line, one on the middle line, and one on the bottom line.

REFLECTION
















Now take some time to enjoy the beauty of nature here at Hemlock Bluffs. Sit quietly somewhere outside in the preserve for 5 minutes. Open up all your senses and soak up your surroundings. What can you smell? How many different bird songs can you hear? What do you see?

 **Draw** a Picture to describe all your feelings about nature.



EXPLORER BINGO!

As you hike along the trails, cross off the things listed below as you see them. Try to get 4 in a row! Remember to leave what you find where you found it.

Pinecone 	Trail Marker 	Log 	Creek 
Eastern Hemlock Tree 	Insect 	Birdhouse 	Trash Can 
Stump 	Nest 	FREE (Draw your own)	Squirrel 
Bird 	Leaf 	Rock 	Acorn 

The trails of Hemlock Bluffs are full of interesting things. Some are natural, and some are manmade. They are important natural features or used by preserve visitors. Did you know that both log and stumps are very important habitats for animals like lizards, salamanders, and insects? Don't forget to put any trash you might have in the trashcans along the trail!

Habitat Hunt!

All animals, including people, have basic needs. Shelter, water, and food are important things for survival. Look at the pictures below and compare the ways people meet their needs and how wild animals use parts of nature to meet their needs.



Fill in the numbers that match an animal's needs to human needs.

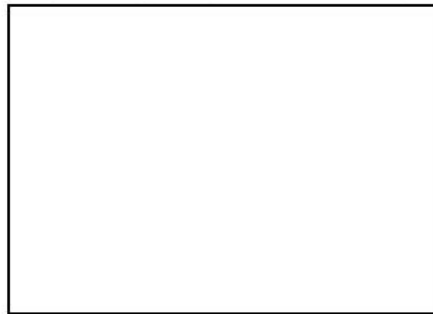


Adapted from Project WILD's "What's that, habitat?" (1986)

My Perfect Plant

Find a plant that you really like and sit down next to it on the trail. Study it carefully.

Draw one of its leaves.
(Don't forget the pattern of its "veins".)



What does it look like?

Where did you find it?

LEAVES, TREES, & PLANT LIFE

ON THE TRAIL . . .

Hemlock Bluffs is home to a wide variety of trees, not just Eastern Hemlocks. Can you find these different types of trees? Check them off as you find them!



American Holly



Tulip Poplar



White Oak



Eastern Hemlock



HABITAT MATCH

Habitats are where animals live. Can you match up these animals found in Hemlock Bluffs with their habitats?



Squirrel



Salamander



Bird



Turtle



Nest



Hole in Tree



Stream



Log

ON THE TRAIL . . .

Can you see any habitats for wildlife? Look for nests, holes in trees, logs, water, and any others you can find!

WILDLIFE



Bird Behavior

Go outside and observe birds around the preserve or in your backyard! Observe birds doing at least 5 of the things listed below and mark them.

- Walking or hopping on the ground
- Preening (grooming feathers with beak)
- Flying with food or nest material
- A group of birds perched together on a branch
- Flying (flapping wings)
- Soaring (no flapping)
- Singing or calling
- Bathing in water
- Sitting on a nest
- Climbing a tree
- Feeding



Tufted Titmouse



Carolina Chickadee



American Goldfinch

Find one of the birds above and circle it!

When bird watching...

1. Keep the sun at your back
2. Stay still and quiet
3. Be patient

To Identify Birds Look At...

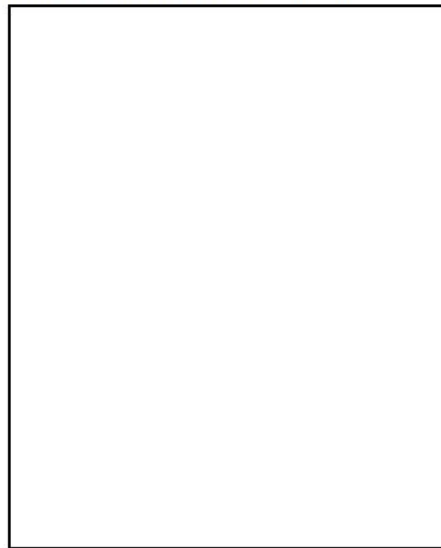
1. Size
2. Color
3. Shape
4. Markings
5. Behavior

Adapted from Georgia State Park Activity Booklet



Draw an Animal

Keep a sharp eye out while you are hiking. Did you see any animals or insects? Draw one you saw below, or if you can't find one, draw your favorite from a preserve bulletin board.



HEMLOCK BLUFFS
NATURE PRESERVE

SENIOR EXPLORER ACTIVITY BOOKLET

(9-12 years old)



Originally created by
Mary Burroughs (2007)

Updated by Deanna Stewart (2009)



Cary Parks, Recreation
and Cultural Resources
www.townofcary.org

LAUGH, LEARN & PLAY where you live.

2



Welcome to the Hemlock Bluffs Nature Preserve Senior Explorer Program!

In completing this program, you will learn about nature here at the preserve. There are a bunch of fun activities for you. We believe the more you know about nature, the more you will want to help us conserve it.



WHY IS HEMLOCK BLUFFS SPECIAL?

Hemlock Bluffs is home to Eastern Hemlock trees, which are normally only found in the Western part of North Carolina. These hemlocks live along the bluffs (small cliffs) which face north and have cooler temperatures. Below the bluffs, Swift Creek creates a moist environment that also favors the hemlocks.

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Special Thanks!

Several of the activities have been adapted from other sources listed below.

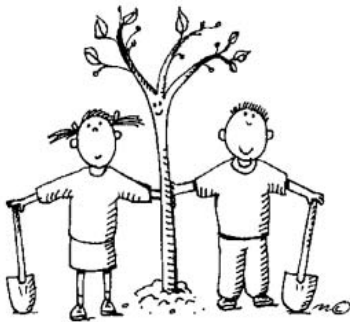
- p.9 – Scavenger Hunt, adapted from the Eco-kids “Eye-spy... in the Woods.”
- p.10 – Nature’s Recyclers, adapted from the Georgia State Parks activity booklet.
- p.11 – Use Your Senses!, inspired by the New Mexico activity booklet.
- p.12 – One Little Plant, adapted from the Minnesota Pinelands activity booklet.
- p.14 – Curious Creatures, adapted from a game in Richard Louv’s book, *Last Child in the Woods*.
- p.18 – Comparing Sounds, adapted from the Florida Everglades activity booklet.



Study nature, love nature, stay close to nature. It will never fail you.

-Frank Lloyd Wright

CONGRATULATIONS on completing Hemlock Bluffs' Senior Explorer Program! We hope that you've learned a lot and had fun completing the activities in this booklet. You are now a Senior Explorer! Take your completed booklet to the front desk in the Stevens Nature Center to receive your prize. Be sure to write your name in the Senior Explorer log and tell your friends about the program!



This Book belongs to:

I am _____ years old. I live in _____
County, in the State of _____,
and go to _____ School.

My address is: _____



My hobbies are:

I like nature because:






HOW TO BECOME A

4 **SENIOR EXPLORER**

1. Attend a Stevens Nature Center Program and fill out the Program Completion sheet in the back of this booklet.
2. Complete 10 activities in the Senior Explorer Activity Booklet, including at least one from each category below.
3. Hike all 3 trails and check them off at the bottom of page 14.
4. Attend a Volunteer Workday and fill out the Volunteer Completion sheet in the back of this booklet.

Key to Categories

	Around the Stevens Nature Center
	On the Trails
	Wildlife
	Leaves, Trees, and Other Plant Life
	Reflection

PROGRAM COMPLETION SHEET 21

Attend a Stevens Nature Center Program

Date of Program: ___/___/___



Name of Instructor: _____

After attending this program, I learned:

I can use this information when I:

Instructor's Signature: _____

SCHOLARSHIP OPPORTUNITIES FOR NATURE PROGRAMS AND CAMPS!

The Friends of Hemlock Bluffs are now accepting applications for scholarships. Scholarship winners will be awarded a \$50 credit to use toward their registration for one or more nature programs at the Stevens Nature Center.

Pick up your application at the Stevens Nature Center or call (919) 387-5980 for more information.

20 **VOLUNTEER WORKDAY
COMPLETION SHEET**

Help out at a Hemlock Bluffs Volunteer Workday

Date of Workday: ____/____/____

Name of Leader: _____

At the workday we helped by:

This is good for the preserve because:

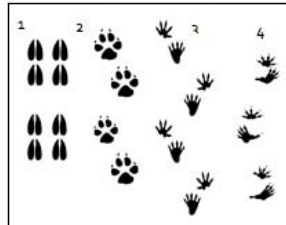
Leader's Signature: _____

TAKE A WALK AROUND THE
STEVENS NATURE CENTER 5
EXHIBIT HALL

Be sure to check out all the different habitats on display!!



When animals leave footprints we call those the animal's tracks. Below are 4 animal tracks that are found at Hemlock Bluffs. Use the track table in the nature center lobby to identify the animal that made each set!

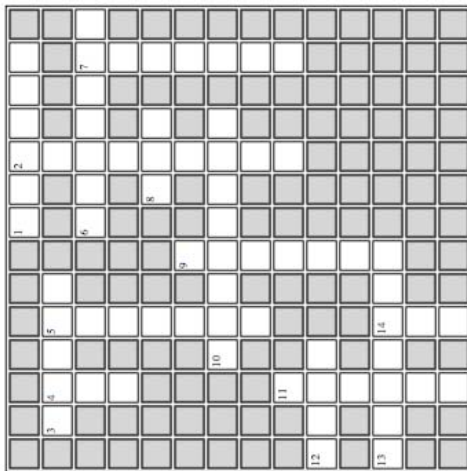


1. _____
2. _____
3. _____
4. _____

At home, go outside with your parents and find a smooth spot in the sand or dirt where you can make your own track! You can leave your shoe on or go barefoot to see what a real human track looks like! Once you see your track, draw it below. Which animal track does it look most like?



6



 **Captivating
Crossword**

Explore the Stevens Nature Center to find the answers to the clues below and fill in the crossword!

Hint: No answers come from the Timeline Wall.


19

**THE SENIOR EXPLORER
PLEDGE**



As a Senior Explorer, I promise to help protect and care for Hemlock Bluffs Nature Preserve. I will continue exploring outside in nature, and I will tell my family and friends about the cool things I learned.

Signed: _____

18  **Comparing Sounds**

Find any spot in the preserve where you can listen quietly. What sounds do you hear? Write them in the lists below.

Preserve Sounds

Natural sounds (made by animals, plants, or natural elements like wind and water)

Man-made sounds (made by people and machines)

Try this experiment again at home.

Backyard Sounds

Natural sounds

Man-made sounds

Where did you hear more man-made sounds?

Where did you hear more natural sounds?

Which did you enjoy more?

Circle the sounds you heard in both places!

Down

- Many amphibians use our _____ pools for breeding and to lay eggs.
- Unlike with food and water, humans can only survive a few minutes without _____.
- _____ insects are found in fast flowing portions of Swift Creek.
- _____ bins help turn extra kitchen and yard waste into fertilizer.
- Rain _____ and cisterns allow you to catch rain water to use.
- _____ owls use their camouflage to roam the preserve day and night.
- White _____ is a slow-growing tree that may live hundreds of years.

Across

- The riparian zone of Swift Creek supports many animals such as river _____ and raccoons.
- _____ is a groundcover plant that thrives on the cool, moist bluffs.
- _____ trees are found along the North-facing bluffs.
- A fallen tree is called a _____.
- A "_____ zone" is the area between a stream and adjacent land and forest buffers.
- A standing, dead tree is called a _____.
- Animals like crayfish and muskrats use _____ as homes.

8  **Time Flies!**

Hemlock Bluffs Nature Preserve's history dates back millions of years! Go read the information on the Timeline Wall to find out more.

The bluffs in the preserve were formed over millions of years. What are two things that happened which allowed the creation of the bluffs we see today?

When the last glacial period ended to the North and West and Hemlock trees began to retreat into colder climates, why did a small population remain in this area without dying out?


Name one group that has lived in this area in the past.

When did they live here?

How did they change the area?

You can see what has happened here in the past by walking the trails. What signs are present?

Hemlock Bluffs and the nature center exist today due to the vision and generosity of Colonel Stevens. What are 2 interesting facts about his life?

 **WILDLIFE WORDSEARCH**


D	V	T	S	N	D	C	T	M	D	T	E	K	C	I	R	C	R	E	M	
T	I	X	S	S	B	G	A	W	U	A	B	T	B	A	B	A	L	V	P	
G	C	D	C	M	A	N	R	R	R	E	E	E	F	O	X	V	T	P	I	A
Q	E	F	Y	Q	M	B	K	J	P	R	S	H	U	J	R	Q	M	T	U	
Q	O	K	V	T	J	L	S	B	E	A	V	E	R	U	H	A	W	K	F	
G	W	X	M	F	A	B	U	O	T	E	C	M	T	E	G	R	J	X	U	
F	Q	L	H	W	F	K	M	A	I	N	A	I	I	S	P	I	M	Y	Z	
R	L	G	L	M	W	U	S	V	I	R	R	F	M	N	Z	P	V	Z	J	
Z	B	V	H	N	O	R	E	C	A	R	D	C	I	S	N	J	O	A	N	
B	L	U	E	G	I	L	L	C	J	E	I	R	J	Z	S	O	W	C	Y	
Q	B	C	R	Y	U	P	C	R	Z	K	N	B	T	W	E	N	W	L	S	
X	B	H	O	P	Y	O	T	S	A	C	A	B	L	O	G	V	F	N	C	
E	L	P	N	C	O	X	S	X	E	E	L	N	I	U	X	R	T	J	H	
P	J	B	A	N	M	V	K	X	B	P	K	A	J	R	E	D	F	V	Q	
R	E	D	N	A	M	A	L	A	S	D	Q	Y	E	T	Y	B	H	R	X	
Z	U	V	K	F	F	L	Q	D	J	O	M	E	T	T	S	M	I	O	P	
F	A	B	C	W	D	G	O	F	W	O	D	U	B	A	S	G	Q	R	L	
F	W	U	U	D	B	E	U	R	W	B	Y	R	R	D	X	R	C	D		
Z	Z	I	D	B	N	I	B	O	R	E	G	I	A	E	F	V	O	L	V	

- BASS
- BLUEGILL
- COPPERHEAD
- DUCK
- KATYDID
- NEWT
- ROBIN
- WOODPECKER
- BEAVER
- BUTTERFLY
- CRICKET
- HAWK
- MINNOW
- OWL
- SALAMANDER
- BLUEBIRD
- CARDINAL
- DEER
- HERON
- MUSKRAT
- RACCOON
- TURTLE
- FOX

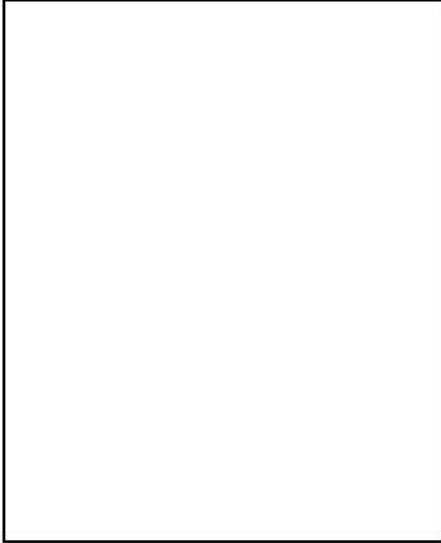


Write a poem about your observations using these simple steps. Or, make up a style of your own.

- Line 1: Write the name of something you like and found at Hemlock Bluffs.
- Line 2: Write one word to describe how it looks.
- Line 3: Write one word that describes something it does.
- Line 4: Write a sentence about how it makes you feel.

 **Draw an Animal**

Keep a sharp eye out while you are hiking. Did you see any animals or insects? Draw one you saw below, or if you can't find one, draw your favorite from a preserve bulletin board.



ON THE TRAILS

GET READY FOR YOUR HIKE . . .

In order to keep our nature preserve looking good for all our visitors, and to make sure all the plants and animals have a nice home to live in, we have to set down some rules.

1. Stay on the Trail
2. Don't Litter
3. Leave Nature in the Preserve
(No Collecting)




Scavenger Hunt

As you walk along the trails stop and look more closely at your surroundings. You can find some interesting things! Below is a list of different things that you could find if you use your senses, find 10 of them and write what you found!

Something that is...

- | | |
|-------------|----------|
| Prickly: | Sharp: |
| Rough: | Round: |
| Slippery: | Smelly: |
| Soft: | Squishy: |
| Stretchy: | Tiny: |
| Triangular: | Wet: |
| Beautiful: | Cold: |
| Dry: | Hairy: |
| Hard: | Heavy: |
| Hot: | Large: |

 **Nature's Recyclers**

Here at Hemlock Bluffs it is very important that we recycle things when we are done with them so that we waste as little as possible. Did you know that nature does the same thing? Nature wastes nothing.

Find two of Nature's recyclers shown below and write down which trail you found it on.



An earthworm or smaller creature that enriches the soil



A hole in a snag used as a home by an animal



An animal eating a plant



Life on a decaying log

Now that you have seen how nature recycles, do some recycling of your own! Write down three items that you recycle at home.

- 1) _____
- 2) _____
- 3) _____

 **HEMLOCK BLUFFS AT NIGHT**

Hemlock Bluffs is not only fun during the daytime. After dark brings out a whole new side of the nature preserve. Animals that are mostly active at night are called **nocturnal**.

Figure out the word scramble and connect them to their pictures!

DAALSAMRNE



Deer

NCORACO



Salamander

REDE



Owl

PMOSUSO



Bat

WOL



Raccoon

BTA



Opossum

Wildlife



Curious Creatures

As you explore Hemlock Bluffs find 9 creatures, or evidence of them! Finding a creature can mean actually seeing one or discovering tracks, nests, and other signs that an animal has passed by or lives there. Draw or describe the 9 things you found in the spaces below!

Hemlock Bluffs offers 3 exciting trails. Make sure you are checking the trails off as you hike them!

- SWIFT CREEK LOOP TRAIL (0.8 miles)
- CHESTNUT OAK LOOP TRAIL (1.2 miles)
- BEACH TREE COVE LOOP (0.9 miles)



Use your Senses!

When you open up your senses to nature you will discover more than could imagine! Find a spot to sit and be quiet. Just concentrate on where you are for at least 5 minutes.

Start by closing your eyes and **listen** to the sounds of the trail. What do you hear? Write down 4 things you heard.

- 1) _____ 2) _____
- 3) _____ 4) _____

Look around the spot where you are sitting. Do you see rocks at the base of a tree? A squirrel running with an acorn? Mushrooms on a log? Write down 4 things that you observed.

- 1) _____ 2) _____
- 3) _____ 4) _____

Stay in the same area, but **smell** what is around you. Do the trees smell alike? Write down two plants you smelled and what they smelled like.

- 1) _____
- 2) _____

Lastly, use your sense of **touch** to observe what is surrounding you. Make sure to be gentle! Are things around you rough? Soft? Write down two things you felt and what they felt like.

- 1) _____
- 2) _____

Don't forget, it's fun to try this in your backyard too!

LEAVES, TREES, and PLANT LIFE



One Little Plant

Look around the courtyard for a plant that you like. Once you have found that plant, sit on the path next to it and examine it more closely.

What do the leaves look like? Describe the shape and features.

Are there any flowers, seeds, fruit, etc? What color are they? What do they look like?

Where did you find your plant? _____

What does it smell like? _____

If you were the first to discover this plant, what would you name the plant based on how it looks?

If you would like, sketch your plant below!



Tree Drawings

Go search for a tree that you like right next to the trail. Any tree will work! Sit or stand near it and get a closer look, but be sure to stay on the trail!

Draw 3 parts of your tree such as: a leaf, needle, fruit, seed, bark pattern, or the whole tree. Be sure to make it detailed.

--	--	--

Is there something else you want to remember about your tree? Write it here!

Identify it!

Use your descriptions or drawings to identify either the plant or tree from the previous activities. You can use a field guide or the Internet for help.

Write down what you identified and three reasons you believe you have found the right identification.

- It is a: _____
- 1) _____
 - 2) _____
 - 3) _____