

Environmental Practicum 2008 Summary Report

Denison University

Environmental Studies Department

Environmental Practicum 2008 Summary Report

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Professor Aguilar

ENVS 301

Dear Reader,

Throughout the semester, the Environmental Practicum course has focused on increasing the visibility and usability of Spring Valley Nature Preserve. Spring Valley, located in Granville, Ohio is a 45 acre nature preserve that was purchased by the Granville Township in 2006. The land is presently under a conservation easement held by the Licking Land Trust, which encourages residents to utilize the land for various passive recreation activities. While the pool that once sat on the property is gone, Spring Valley still has many opportunities, both educational and recreational, to offer the residents of Granville. Our class worked with various stakeholders in the community to develop and complete projects that make Spring Valley much more user friendly for Granville.

The structure of our class revolved around four phases, with each phase having an elected pair of phase leaders. Phase I, the *Identify Stakeholders and Project* phase, required our class to examine various problems at Spring Valley and then narrow down a very long list of project opportunities to the four projects we ultimately worked on. Additionally, we determined which organizations and stakeholders we would be working with throughout the course of the semester. After determining the four project groups; Mapping and Boundaries, Trail Maintenance, Rules, Volunteers, and Bridges, Public Relations, and Environmental Education/Sign we began our work on the second phase.

Phase II, the *Research for Group Project/Proposal* phase, required each group to do background research and make preliminary contacts with their stakeholders in order to put together a substantial project proposal. This helped groups organize their ideas regarding their individual project and outlined their goals for the semester. The proposals laid the groundwork for the next phase, Phase III; *Implementation*. Phase III comprised of nuts and bolts labor that went into accomplishing our goals for the semester. During the five weeks of Phase III, each group actively met with stakeholders, researched, and worked on accomplishing their goals. By the end of this phase, each group had accomplished its goals and our class prepared for the fourth phase, *Final Presentation of Project for the Stakeholders*. Phase IV required each group to elaborate further on their original proposals, discussing their accomplishments, challenges, and hopes for the future regarding the work they had done over the course of the semester.

Furthermore, each group prepared a presentation to give to all of the stakeholders involved in the class's work throughout the semester. The stakeholder presentation, held on December 8th, succeeded in sharing our work and gave the stakeholders a chance to share their opinions on our work.

This document represents the compilation of the final reports written by each group during Phase IV. Each report outlines the objectives, methods, limitations and problems, future research and projects, and explains and displays the final products of each group. At the end of this document, we have put together a complete appendix of the final products of each group and future research opportunities.

Sincerely,

Emily Handelman and Sam Keenan, *Phase IV Leaders*

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Mapping and Boundaries

Drew Homyk, Lizzie O'Meara, John Murphy Cristin Mustillo

Introduction:

As part of a community-wide effort to increase accessibility of Spring Valley Nature Preserve, our group focused on creating a trail map of the Spring Valley and Salt Run properties and compiling information for marking the boundaries. Ultimately, the finished map along with preserve rules, which were developed by another group, will be displayed in a kiosk near the parking lot as well as in a brochure available to visitors.

Objectives:

The objectives of this project were threefold. The first was to create a trail map of the Spring Valley and Salt Run properties for public use. The second was to compile the necessary information and resources to map and mark the boundaries of Spring Valley and Salt Run. The third was to display a map of the property as well as rules and trail maintenance tips in a kiosk built by an Eagle Scout. Additionally, the kiosk will hold brochures containing the trail map and rules for the property. Our group believed the completion of these projects would make Spring Valley more accessible and easier to navigate for Granville community members.

Methods:

In order to accomplish our objectives, our group utilized several methods. We created a map of the trails at Spring Valley by geocoding. Geocoding is the process by which the GPS (Global Positioning System) points of an area are recorded. These GPS points can be integrated into a map as exact coordinates. Using a portable GPS unit, points on the trails were recorded, stored, and uploaded onto a computer. They were then integrated as a layer on a map using ESRI's ArcGIS software. We utilized the GPS unit's "tracking" feature that can estimate a contiguous line or trail based off of automatically recorded points. These GPS points were overlaid onto a satellite image of Spring Valley obtained online from the Ohio Geographically Referenced Information Program (OGRIP). OGRIP is an organization that develops GIS data for the state of Ohio.

We compiled the information and resources for mapping and marking the boundaries based on correspondence with various individuals. For marking the boundaries, Craig McDonald suggested tree paint, while Dr. Doug Spieles suggested Licking Land Trust medallions. However, marking was only one aspect of our work with the boundaries. In an attempt to help us with mapping of the boundaries, Mary Fitch, of the Licking Land Trust, provided us with a PDF map of the boundaries. But, PDF files do not contain coordinate information, and thus we could not integrate this data into our trail map. Unable to find an individual who knew the location of the boundaries, we contacted the surveyor that conducted a survey of the Spring Valley property in 1998 to inquire if he would walk the boundaries with us. He provided us with the contact information for the surveyor who has done the most recent survey in 2006, at the property's acquisition by the Township.

After obtaining our data and preparing the map, we then compiled the information into a brochure utilizing Microsoft Publisher. Each brochure contains a copy of the trail map and preserve rules, as well as a photo of Spring Valley. Office Services, located in the Doane Administration building at Denison University will print 1,000 copies of the brochure as well as large-scale versions of the preserve rules developed by another group, and our completed trail map. The large-scale map and rules will be placed in a kiosk to be built by an Eagle Scout by summer 2009. A pamphlet holder on the side will house brochures containing the information displayed in the kiosk, so that hikers may have a copy to carry with them. As the kiosk has yet to be started, its dimensions will be based upon the size of our printed products. The map will be 24 x 36 inches and, when printed, the size of the preserve rules will be complementary.

Limitations/ Problems:

Our one limitation was obtaining information regarding property boundaries. Despite the fact that the land had been previously surveyed before the Granville Township acquisition, we were unable to find an individual who could help us locate the boundaries. Mary Fitch provided us with a PDF boundary map of Spring Valley from 2006, but the map does not have coordinates. We also obtained an outdated survey map from 1998, however it proved difficult to find the boundaries based off this document. Provided more time, we could have utilized the Integrated Mapping System on the Licking County Tax Assessor's website to get boundary

coordinates, and then used a GPS to physically locate them. However, given the amount of possible error in this process, it would have only been suitable for mapping and not for permanently marking the boundaries.

Future Research/ Projects:

It is our hope that the boundaries will be consistently marked using both paint and medallions. To locate the boundaries, stakeholders can work with A.J. Myer, a surveyor who conducted a survey in 2006. Stakeholders and volunteers can then begin marking once they are familiar with the boundaries. Once the boundaries are located, Licking Land Trust medallions will be used on the Spring Valley property but cannot be used on Salt Run, as it is not a Land Trust property. These signs will be nailed into trees on the boundary line. Paint will permanently mark trees and may be used on the boundaries of both Salt Run and Spring Valley, thereby providing a uniform boundary marker. With well-marked boundaries, it will be easy to geocode, and ultimately those points can be integrated into the completed trail map of Spring Valley and Salt Run.

Summary:

Spring Valley's ecological viability could be compromised by visitors walking off trails or not respecting the rules. Providing basic information as to the trail locations and rules will help protect the Spring Valley ecosystem and keep preserve visitors safe. With a trail map available, Spring Valley will be easier to navigate and Granville residents will then be more likely to frequent Spring Valley. With increased community exposure and the help of Boy Scouts in completing maintenance projects, such as the construction of the kiosk, these projects are the first step toward recreating the sense of community that has been historically present at Spring Valley.

Spring Valley Sign

Hannah Daugherty, Kate Henderson, Jessie Hogue-Morgenstern

Introduction:

The overarching goal of our class was to make Spring Valley Nature Preserve more usable and accessible to the community. Prior to our class beginning work at Spring Valley, no sign denoted the entrance to Spring Valley. Having a welcome sign off of Route 16 is essential to informing community members about the preserve. The sign we designed increases the visibility of Spring valley as it informs people passing by that the nature preserve is there.

Objectives:

Our objective was to create a welcome sign for Spring Valley. In creating the sign we had to obtain a price quote from a sign company and also create a mock-up of the sign. We ultimately hired the Kessler Sign Company to design and install our sign which, once finalized, would take ten days to install. Originally our goal was to install the sign by November 8, 2008, the day of Spring Valley Fall Festival.

Methods:

The construction and design of the sign took several steps. We began by obtaining a price quote to make sure the sign was within our budget. We contacted Kessler Sign Company whom the Denison University Environmental Studies Program has worked with in the past and has installed several signs in the Granville area. After sending the dimensions to Kessler, the final cost of the sign came out to \$1287.00, which was within our budget. Since the cost was reasonable we were able to begin work on the design. We worked with Dr. Spieles, a member of the Licking Land Trust, and the Township Trustees to develop an approved design to send to Kessler. It was important to work with these groups because, as the primary stakeholders at Spring Valley, they make the final decisions.

There were several key elements which needed to be on the sign: the name, the Clean Ohio Fund logo, when the preserve is open, Granville Township Trustees, and Licking Land Trust. It was necessary to include the Clean Ohio Fund logo because they provided funding for

the purchase of Spring Valley as a nature preserve. The dimensions of the sign, as learned through Dr. Spieles, could be no larger than six feet by four feet and could stand no more than ten feet high. We also wanted the sign to resemble a wooden trail sign found in many state parks (brown wood with yellow lettering; see Appendix B.1).

With the mock-up finalized and approved, we worked on finding a location for the sign at the preserve. We researched limitations based on the Spring Valley easement and Granville sign regulations. We met with Don Wiper, a member of the Land Trust, and Township Trustee Wes Sargent out at Spring Valley to pick an installation site. According to township regulations, the site needed to be twenty feet away from Route 16. At Kessler's request, we then sent a billing address and a site map of the entrance of Spring Valley that showed the location of the sign so construction of the sign could begin.

We finalized the mock-up with Kessler and asked that they put the sign into production on November 10th. With this date, the sign should have been finished and installed ten business days later, November 24th. However, the sign was not installed until December 12th.

Limitations/Problems:

We encountered many bumps in the road during the process of creating the sign. Our first major problem was when the Trustees wanted to add content to the sign because Kessler had already sent us a preliminary mock-up, which required more time and communication between us and Kessler. Simultaneously, the Clean Ohio Fund logo changed. We informed Kessler that the new Clean Ohio Fund logo needed to be included, but we ran into issues with the digital file format the logo was sent in. Ultimately, we settled for the old Clean Ohio Fund logo which the Trustees approved. Other limitations we ran across were regulations for road signs in the Granville Township. Our sign had to meet specific size regulations as well as specific placement regulations.

Overall, reaching our objective of having the sign installed by November 8th was not attained because of several changes made to the sign that were time consuming. At the same time, staying in contact with Kessler was difficult because they were not always quick to respond and only responded during business hours.

Summary:

Though this objective was not completed in a timely manner, we managed to put a sign at the entrance of Spring Valley Nature Preserve that meets the requirements and regulations of the town of Granville and the property easement. It serves as a reminder to the public that the preserve exists and makes accessibility easier.

Trail Maintenance, Rules, Volunteers, and Bridges

Mariah Bauman, Zach Huttie, Caitlin Splawski

Introduction:

An inclusive nature preserve needs to be accessible to all while still fostering high standards for environmental integrity. While Spring Valley has a group of regular visitors, we believe that the usage would increase if a stronger trail system were in place. By improving the condition of stream crossings, establishing a set of rules to ensure the safety of the land and the people using it, and getting the public more involved with the care and upkeep of Spring Valley we believe the preserve will become more accessible while generating a stronger connection and a sense of place. Our group focused on trail maintenance, getting the Granville community involved in taking care of Spring Valley, and establishing a set of rules to keep both the preserve and its visitors safe.

Objectives:

Our overarching objective was to make Spring Valley more accessible to community members, hold the land to the highest environmental standards, and foster more community involvement for visitors to develop a sense of ownership of the area.

Construct a Bridge

After meeting with stakeholders and visiting Spring Valley, we noticed that stream crossings are impassible for many of the preserve's potential visitors, including the elderly and some children, without assistance. They are also impassible to even the fittest of people during the winter months. The rock bridges currently in place are often swept away during heavy rainfall and do not seem to meet the needs of those that utilize Spring Valley.

Establish a Set of Rules Specific to Spring Valley

Rules are necessary for a safe environment both for the preserve itself and the visitors that frequent Spring Valley.

Install Kiosk to hold Maps, Rules, and Trail Maintenance Guides

Information about Spring Valley also needs to be accessible. This would help visitors know where they are and know how the area is meant to be utilized.

Recruit Volunteers for Trail Maintenance

Having volunteers is required not only to keep trails maintained, but to also develop greater community involvement and investment.

Create Trail Maintenance Guide specifically for Spring Valley

In order to help volunteers feel prepared to get involved with trail maintenance at Spring Valley they need instructions for how to go about doing trail maintenance. These instructions will be easy-to-follow and adapted specifically to Spring Valley and its visitors so that trail maintenance can be conducted in the simplest manner. Also having a guide with contact information is important, so that visitors know who to talk to about getting involved.

Methods:

Construct a Bridge

We began the process of constructing a bridge by determining what type of bridge needed to be built. While we had some rough ideas for a bridge from earlier in the semester, we realized that they were unacceptable because of inadequate design and amended these plans. Our new plans were approved by the Township Trustees and we set out to implement them.

We met with Craig McDonald to discuss bridge plans. Craig McDonald is a science teacher at Granville's middle school and is the 'guru' for Spring Valley, having been involved with the area his entire life. He currently does most of the trail maintenance at Spring Valley. Craig told us about the steps a local Boy Scout followed to construct a bridge at Salt Run, an adjacent property. After reviewing our plans, he felt that they would not work for the crossings at Spring Valley and told us that more substantial bridges were needed. He recommended speaking with an engineer to put together plans for a bridge or collaborating with Boy Scouts who may want to take on the project of building a bridge. We explored both routes by first asking Craig which engineer the Boy Scout had used for the bridge at Salt Run and how to

contact this person. We were unable to make contact with this engineer. We also spoke with several Boy Scouts and realized there was no immediate interest in this project. Our progress in constructing a bridge was halted, so we decided to devote our time to our other objectives.

Establish a Set of Rules Specific to Spring Valley

For the development of rules for Spring Valley, we adapted the rules in place at Denison University's Biological Reserve to fit the specific requirements of the preserve. Since there is a conservation easement on the land, passive recreation is the only type of activity that is permitted at Spring Valley. There are also a number of unique features in the preserve, including the shelter houses and fire pits, which also needed guidelines regarding use.

In order to ensure that the rules met these requirements, they needed to be reviewed and approved by various stakeholders – the Licking Land Trust, the Granville Township Trustees, and Craig McDonald. After we created the new set of guidelines, we sent the guidelines to the stakeholders for review. For the Licking Land Trust, we contacted Dr. Spieles and for the Granville Township Trustees, we contacted Bill Habig. Once we received their comments, as well as Professor Aguilar's thoughts, we made a final draft. We sent the final version of the rules to the mapping group to put in their brochure. The final version of the rules can be found in Appendix C.3.

Install Kiosk to hold Maps, Rules, and Trail Maintenance Guides

Originally, we planned to work closely with the Mapping Group to develop a brochure, in addition to working with them to design and construct a sign to display the rules and a map. This plan changed when we learned of an Eagle Scout project to build a kiosk at Spring Valley. As a result, we only needed to tell the Eagle Scout what dimensions we needed the kiosk to be in order to fit the map, rules, and any other information we may want to display. Therefore, the kiosk will be completed by the Eagle Scout by summer 2009.

Recruit Volunteers for Trail Maintenance

To complete this task we had to find some local organizations interested in doing volunteer work. We sent an e-mail to all potential volunteer organizations explaining our project

for the semester, ultimately receiving responses from the Kiwanis Club, Granville Boy Scout Troop 65, and Granville High School Key Club. We attended our potential volunteer organization meetings and explained our trail maintenance work at Spring Valley. During these meetings we stressed that we wanted to get volunteers for this project and for this to be an ongoing process. We also had a community members express interest in volunteering at the Spring Valley Fall Festival organized by the Public Relations group.

We met with Craig McDonald to discuss trail maintenance and volunteers. He told us he would gather volunteers and try to attend scheduled trail maintenance days. He also suggested we organize the volunteers through the Environmental Studies department along with him. We thought this was a great idea and put together a list for the Environmental Studies department and Craig to keep. They will coordinate future trail maintenance days.

Once we had compiled our list of volunteers, we organized a trail maintenance day on December 6th. We had a small, but hardy group of volunteers from the Granville High School Key Club. They seemed to enjoy their time spent out there and were interested in doing Spring Valley trail maintenance in the future. The current volunteer list can be seen in Appendix C.2.

Create Trail Maintenance Guide Specifically for Spring Valley

The idea for creating a trail maintenance guide for volunteers stemmed from a lack of help maintaining trails at Spring Valley. There was a need for a guide to show the average person how trail maintenance is done. We researched how to properly do trail maintenance that would be applicable to Spring Valley.

We utilized the Student Conservation Guide to learn about trail maintenance. Additionally, we worked with Craig McDonald, meeting with him at Spring Valley to discuss trail maintenance issues specific to the preserve. He also gave us some resources which we later used to put the guide together and helped us determine what types of maintenance needed to be done at Spring Valley. From these meetings and research, we decided that all the information that a volunteer would need to perform trail maintenance at Spring Valley could fit on an easy to read, easy to carry around pamphlet.

Included in the guide are descriptions of tools used for trail maintenance and instructions for pruning vegetation and maintaining the integrity of the trails through soil care. After

compiling the guide, we sent it to Craig McDonald, as well as Dr. Spieles from the Licking Land Trust, Lesa Miller from the Granville Recreation Commission, and Grace Gordon a community stakeholder with a vested family history in Spring Valley to look over and approve the guide.

We had the final trail maintenance guides printed at Denison's Doane Copy Center. There are 300 total hardcopies of the guide. 100 copies will stay with Denison's Environmental Studies Department for when they hold trail Maintenance Days at Spring Valley and 100 copies will be put in the kiosk at Spring Valley when it is built next year. An additional 100 copies will go to Craig McDonald for when he hosts Trail Maintenance activities at Spring Valley. Please reference Appendix C.1 for the Trail Maintenance Guide.

Limitations/Problems:

Our main limitation in establishing a set of rules, compiling a trail maintenance guide, and gathering volunteers was the degree of difficulty that we encountered in trying to communicate with stakeholders. For instance, it was hard to get in touch with stakeholders that did not respond to us via email in a timely manner. Also, it was difficult for us to figure out exactly who to talk to about specific ideas. Though we were able to overcome these difficulties for most of our objectives, it proved insurmountable for our first objective of constructing a bridge.

Construct a Bridge

The main reason we were unable to construct a bridge out at Spring Valley was due to a lack of communication between the stakeholders and our class, but also a lack of communication between the stakeholders themselves. At the beginning of the semester, a group of community stakeholders told our class that Spring Valley needed some bridges over the stream crossings to increase accessibility. However, when we tried to get input about what kind of bridge should be installed at Spring Valley, very little consensus as to what should be out there existed. The stakeholders were divided into two camps. Some of the stakeholders wanted a large, intrusive, but sturdy bridge, while others did not want any bridge at all. Regardless, the easement required any bridge to be a low-impact bridge. All in all, it was impossible for us to address the needs of the stakeholders given the short amount of time in our class, on top of the fact that they all possessed conflicting opinions of what needed to happen.

Future Research/Projects:

Construct a Bridge

We ultimately did not construct a bridge due to limited consensus and communication among stakeholders about the design. Our group developed plans that were approved by the Township Trustees (Appendix C.4). In the future, a meeting between all stakeholders is imperative to building a bridge, so that a collaborative decision can be made about bridge design. There is a need for bridges at Spring Valley not only to make it accessible for all types of people that may visit, but also to make the trails accessible year-round since in the winter it is impassable for even the fittest.

Establish Rules for Spring Valley

A potential future project for the rules could be to see if they are actually being followed, and determine whether they are sufficiently protecting the preserve and those who use it. To that end, it may be beneficial to reassess the rules after five years based upon preserve usage.

Install Kiosk

There is already a plan in place for a boy scout to implement this objective by the summer of 2009. We will provide him with the map and rules to go onto the kiosk, so it should be relatively easy for him to accomplish.

Recruit Volunteers for Trail Maintenance

For future projects we need to have two or three volunteer trail maintenance days a year with one in the winter, one in early summer, and another again in late summer. We also need to continue to schedule trail maintenance days through the Denison University Environmental Studies department with the assistance of Craig McDonald. Moreover, it would be beneficial to increase volunteer involvement.

Trail Maintenance Guide Specifically for Spring Valley

There are several things that can still be done for trail maintenance at Spring Valley. As far as the trail maintenance guides go, there needs to be a good way to distribute them. Once the information kiosk is installed at the nature preserve this will make distribution easy. Additionally, our group would like to post the guide on either the Licking Land Trust or Granville Recreation Commission's websites to increase its visibility.

Summary:

Recreational trails are wonderful additions to existing park areas. As one trail maintenance book explains, "Trails allow travelers to access terrain they might not otherwise visit" (SCA 20). A main goal of the Spring Valley Nature Preserve is to bring people into a region where they can learn about and how to respect the non-human world. Because of Spring Valley's proximity with the town of Granville one of our biggest goals was to make the trail system more accessible to hikers of varying ability, including children and the elderly.

Our group has definitely made Spring Valley a more accessible place for all. We have established a set of rules to keep the land and the people who visit this area safe. We also established a group of volunteers and put together a comprehensive trail maintenance guide for the continuing care of Spring Valley. These things are essential to Spring Valley being an equitable and environmentally sound nature preserve. Although, we failed to construct a bridge or install a kiosk out at Spring Valley, we have collected valuable information for these tasks to be tackled in the future.

Environmental Education

Hannah Daugherty, Kate Henderson, Jessie Hogue-Morgenstern

Introduction:

Our group worked to address the lack of connection the children of Granville have with their natural environment. It is important for children to develop a sense of place and wonder which can be achieved through developing their connection with the natural environment (Ogle 8). A sense of place is the feelings and memories created within a specific location. With a new found curiosity and respect for nature, children will be more interested in exploring the environment rather than spending time indoors.

To address these issues, we developed an environmental education curriculum activity guide to engage Granville children with the natural environment that is available at the Spring Valley Nature Preserve. This guide provides the Granville community with an example of how the land at Spring Valley Nature Preserve can be utilized for education. Denison University's Community Association (DCA) program has an Environmental Education committee that has already implemented an after school program for third graders based off of a recent graduate's senior research. We thought, however, that the program needed to be expanded and enhanced. After much consideration, we decided that the activities needed to include multiple age groups.

Objectives:

We had several objectives to accomplish over the course of the semester. Creating an environmental curriculum to utilize at Spring Valley was our main objective. We planned to develop a six-week, sixth grade curriculum to be used at Spring Valley. This quickly changed as we began meeting with two stakeholders, Grace Gordon, a community stakeholder with a vested interest in Spring Valley and Becky Evans, a local sixth grade science teacher. We altered our curriculum to be a lesson plan applicable for children in grades kindergarten through sixth. Also, we changed the purpose of our activity guide from being a guide used in an after school program, like that of the DCA, to being a guide used by the teachers for field trips to Spring Valley.

Methods:

First we met with Grace Gordon to discuss our goal of creating an environmental education curriculum. Grace recommended the *Project* series of books on environmental education to help us develop lesson plans. Grace also suggested that we contact Becky Evans to talk about science education. Using the *Project* books, we began compiling lessons for sixth graders.

After meeting with Becky, however, our curriculum objectives changed. Becky told us that Granville children are extremely busy in regards to extra-curricular activities. Consequently, she believed that an after-school program would be poorly attended. She suggested that we create a curriculum following Ohio's standards for science education that teachers could utilize and incorporate into their lessons. She added that meeting these standards with each lesson would give teachers further incentive to use the lessons. With this information, we decided to create lessons for kindergarten through sixth grade (Appendix D.1). We adapted lessons from the *Project* books for each grade to reflect Ohio science standards. The adapted lessons were compiled and submitted to Grace and Professor Aguilar for review. Corrections to the curriculum were then made. Finally, the finalized curriculum was taken to the copy center in Doane Hall to have copies printed and bound.

Limitations/ Problems:

We initially had proposed to create a six week, six-lesson after school curriculum for sixth graders. We talked to Grace Gordon about our plans and she recommended that we focus on a single concept for the six week curriculum that would reflect what Granville students were learning in their science classes. However, after our meeting with Becky Evans, we decided against the six week, six lesson program for two reasons. We learned that fifth graders, not sixth graders, concentrate on environmental science and as a result our lessons would not reflect the school's science curriculum. Becky informed us that children in Granville are very busy and implementing a new after school program would be challenging. After learning information from Becky, we reconsidered our approach to the curriculum. This reconsideration was a significant challenge for our group as it forced us to re-examine our methods. We ultimately decided to

create an activity guide that covered grades kindergarten through sixth and that met the state of Ohio science standards.

Overall, the largest limitation throughout this process was communication with Becky and Grace. Coordinating our schedules with theirs in order to find times to meet was difficult. Had we been able to meet with Becky earlier, we could have spent more time on our activity guide.

Future Research/Projects:

As for the future of this activity guide, we would like neighboring school systems to use this guide at Spring Valley. We believe it could be used for field trips. If the teachers use this guide at Spring Valley, then they accomplish two things: they get children outdoors and teach children something that is mandated by the state. To accomplish this, we will give each school that shows interest in our activity guide a copy that they can keep in their school. They will be given to Granville Elementary and Intermediate schools as well as the Welsh Hills School. We would also like the guides to be distributed to schools in Newark.

Summary:

We created an activity guide for groups of children in grades kindergarten through sixth. The activity guide meets the state of Ohio science standards and is specifically designed for use at the Spring Valley Nature Preserve. With the help of Grace Gordon and Becky Evans, our group put together a guide that meets these goals. By creating this guide we hope to have created a tool that will be used in the future to connect children with their environment.

Public Relations

Christy Conley, Suzie Humphrey, Gina Weinberger, Natasha Wright

Introduction:

Since the use of Spring Valley has shifted from serving as a pool site to a nature preserve, Public Relations strove to educate the community about the implications of such a change. The new conservation easement means that the land is not only protected from commercial and residential development, but there are several other restrictions in place to protect the property. In early September, stakeholders expressed concern that the community at large does not know that Spring Valley is open to the public and is not aware of the meaning of passive recreation. Public Relations worked to address these concerns through our group's activities. To inform the public and to reinforce residents' connections to Spring Valley, we took on four major projects: a Spring Valley Fall Festival, the development of a historical pamphlet, general informational fliers and website updates. Through these projects, the Public Relations Group has set a significant precedent to be emulated in the future to foster greater community interaction with the preserved local entity.

Objectives:

Given those stakeholder expectations, we developed three main objectives. The first was to increase community awareness about Spring Valley. The second was to educate community members about passive recreation and the types of activities available at this site. Finally, we hoped to help the community feel connected to Spring Valley.

We outlined several ways in which we would achieve these goals. First of all, we decided that planning a community event would bring community members together on the property and engage them in the types of activities permitted by the conservation easement at Spring Valley. Next, we created fliers explaining passive recreation and fliers advertising our class's events and accomplishments. We distributed these fliers throughout Granville to educate the community. We also created a historical pamphlet to help community members feel a connection to the land. In addition, we used newspapers and radio to get the word out about Spring Valley. Finally, we noticed that the Granville Recreation Commission website and the Licking Land Trust website contained little or no information about Spring Valley. Therefore,

we worked with these organizations to update their web pages so that they would include a section explaining the ways in which Granville residents could use Spring Valley.

Methods:

Spring Valley Fall Festival

In an effort to advertize that Spring Valley is a nature preserve and is open to the public, we decided to create an event to introduce Spring Valley to Granville. We reserved the large shelter house at Spring Valley on October 23rd, and the event took place on November 8th.

Furthermore, we asked that each group demonstrate to stakeholders what types of projects they were working on throughout the semester. The Mapping and Boundaries group gave guided tours of the trails that they had mapped with GIS, and the Trail Maintenance and Bridges group showed how to properly maintain trails. Finally, the Environmental Education group worked with children, teaching them how to interact with natural surroundings.

On October 29th and 30th, publicity fliers were placed in highly visible locations in well-trafficked areas in Granville such as Whit's, Brew's, the library, banks, churches, and CVS (Appendix E.1). Invitations were sent to the members of the Licking Land Trust and to the Granville Township Trustees. We utilized Denison's Sodexo catering services to provide food and beverages at the Fall Festival, and booked a bluegrass band for entertainment.

History Pamphlet

Spring Valley has had a central role in the community for about a century, hosting numerous reunions, family picnics, and Denison biology classes. The historical pamphlet traces the ownership of the property, highlighting such events. It explains the ecological history of Spring Valley as well. Our group employed a number of sources for the pamphlet. We first contacted the Granville Historical Society as a resource for the history pamphlet. Next, we contacted Grace Gordon who, as a member of the Roberts family, is knowledgeable about the history of Spring Valley. She provided us several key articles detailing Spring Valley history. After several drafts, we completed the historical pamphlet and copies were available at the Fall Festival. We plan to have the brochure on display at the Historical Society, and at Spring Valley

itself once the kiosk is completed by summer 2009. The final version of the historical pamphlet can be viewed in Appendix E.3.

Spring Valley General Information

To inform the community about the new restrictions brought about by the conservation easement and to illustrate how people can continue to enjoy Spring Valley, we felt that it was necessary to display “passive recreation” posters around the village of Granville (Appendix E.2). They defined the term “passive recreation” and provided examples of what activities are allowed at Spring Valley. Additionally, to ensure that information about Spring Valley Nature Preserve is updated, we anticipate working with the Licking Land Trust and the Granville Recreation Commission to update their websites. Thus far, we have drafted proposals for both organizations to use (Appendices E.4 and E.5).

Limitations/Problems:

One limitation involved website updates. We anticipated that the Licking Land Trust and the Granville Recreation Commission would be able to quickly update their websites if provided a draft. However, we discovered that website updates take longer than we originally expected. The Licking Land Trust’s webmaster works on an ad hoc basis. While we did provide a draft for their website update, this update will not actually occur until early 2009.

We also ran into some roadblocks with the historical pamphlet. First, we needed to get feedback and incorporate corrections from several students and Professor Aguilar. This process required a lot of emailing back and forth, and we worried that we would not be able to get the pamphlet printed on time with all of the corrections. The second roadblock was figuring out how to cite the documents used to write the historical pamphlet. Grace Gordon had given us some helpful articles on the community and ecological history of Spring Valley; however, two of the documents did not have enough citation information on them. We contacted Grace Gordon about these citations and remedied the situation by gathering citation information.

Furthermore, we planned to use photos owned by Anne Ormond for our fliers and for the historical pamphlet. These photos were given to us by the Granville Historical Society, who informed us that all we needed to do to use the photos was ask Anne Ormond for permission.

Unfortunately, we were unable to contact her. We did not have her permission and could not use them. Instead, we took our own photos of Spring Valley.

Future Research/Projects:

In theory, public relations work with Spring Valley will never be completely done; we can hope, however, that over time it becomes less necessary. As the community becomes acquainted with Spring Valley once again, it will become a significant gathering place. The community as a whole needs to utilize Spring Valley frequently over the next few years. While the Fall Festival was a great start, more events are necessary. For example, Denison University should be encouraged to meet at Spring Valley for class sessions and casual events. Various Granville clubs, businesses, and schools should be informed as well that Spring Valley is available for their use.

During the course of this semester, we developed a general flyer advertising Spring Valley and the range of activities permitted at the preserve. However, dispersion of these flyers was fairly limited. Targeting schools, daycares, and other places that families frequent would be a great next step. While a certain degree of pressure may be necessary to get Spring Valley on the community's radar once again, the more it is used the less public relations work will be needed.

In addition to the flyers, webpage drafts for Spring Valley have been completed and sent to the Granville Recreation Commission and the Licking Land Trust. When these organizations perform website updates, they will include our additions. Unless significant changes occur at Spring Valley, these drafts are up-to-date and simply waiting to be added to their respective webpages.

Summary:

To reiterate, our primary objective as Public Relations was to increase community awareness about Spring Valley Nature Preserve and its resources and to help the community feel connected with the local natural environment. We also felt that it was important to educate the general public about the history of Spring Valley and its role within the community. We were able to achieve these goals by creating and distributing general information posters, generating

informative historical pamphlets, and effectively advertising and hosting a community event at Spring Valley.

Works Cited:

Ohio Geographical Referenced Information Program. December 2008. OGRIP. Date accessed, October 16th, 2008. <http://ogrip.oit.ohio.gov/>

Ogle, Megan E. A Community Needs Assessment on Nature and Education: The Need for the Spring Valley Environmental Education Center in Granville, Ohio. Denison University Summer Scholar Project: 2007.

The Student Conservation Association (SCA). 1996. *Lightly on the Land: The SCA Trail Building and Maintenance Manual (Second Ed.)* Seattle (WA): The Mountaineers Books.

Appendix A: Mapping and Boundaries

A.1 – Community Members:

Olivia Aguilar: aguilaro@denison.edu

Mary Fitch: mfitch3@columbusrr.com

Craig McDonald: cmcdonald@laca.org

Dr. Doug Spieles: spieles@denison.edu

A.2 - Boundary Marking Materials:

Bark-Mark Water Clean-Up Tree Marking Paint:

- 1 Gallon of Yellow Paint @ \$18.50/ gallon
- <http://www.forestry-suppliers.com/>


Licking Land Trust Medallions:

- Available from the Licking Land Trust

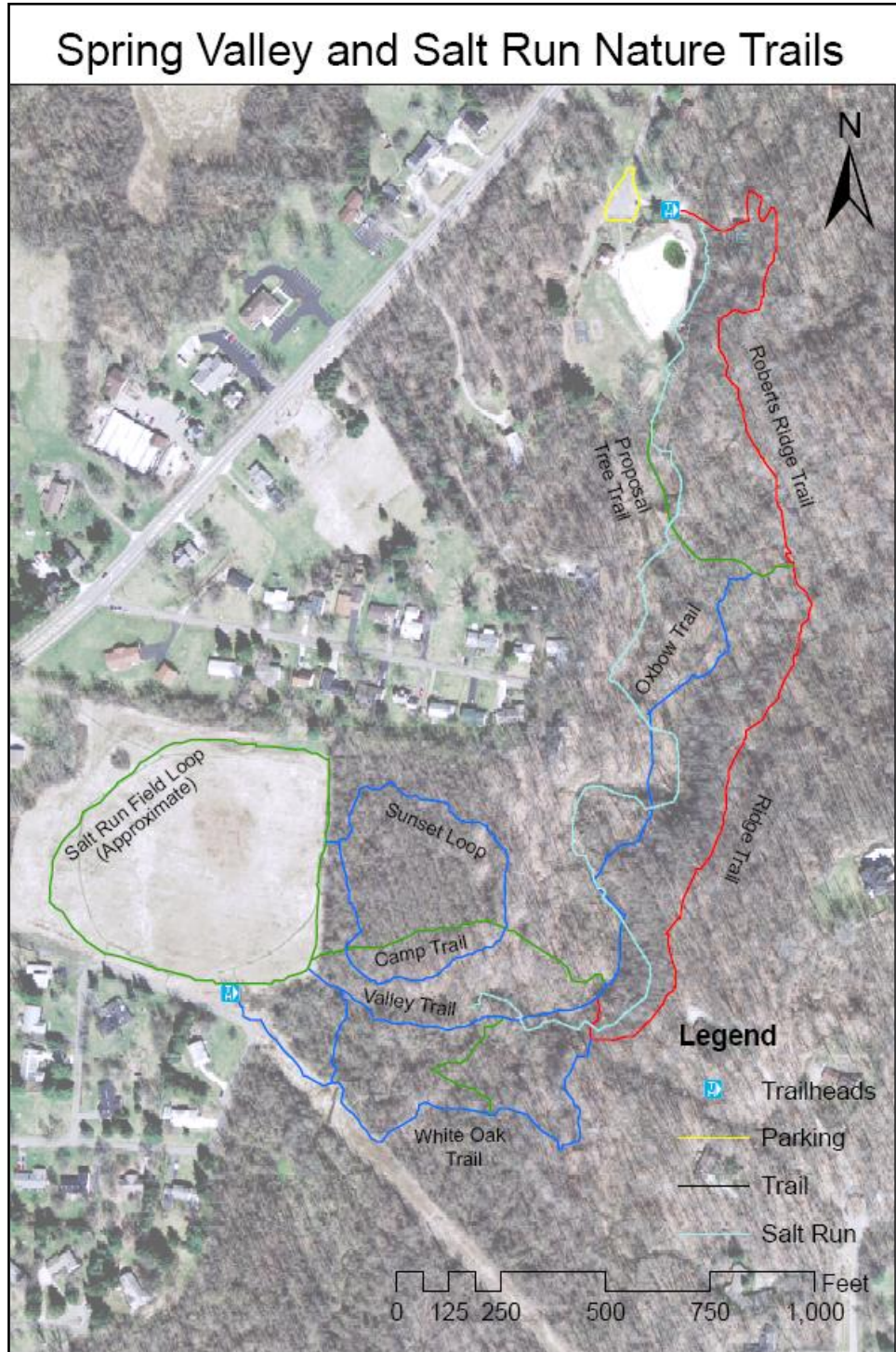
Surveyor Contact:

- A.J. Myer
 - Office: (614) 235-8677
 - Myerssurveying.com

A.3 – Spring Valley Rules and Map Brochure

<p style="text-align: center;"><u>GUIDELINES</u></p> <ol style="list-style-type: none">1. The preserve is open daily from dawn to dusk.2. Motorized vehicles and horseback riding are prohibited.3. Dogs may be walked on trails but must be on a leash to minimize stress to wildlife. Dogs must be under control at all times.4. Collection of mushrooms, wildflowers or any organism in Spring Valley is prohibited.5. No off-trail hiking is permitted in Spring Valley without permission of Granville Township or the Licking Land Trust.6. Hunting and the discharge of firearms are strictly forbidden.7. Mountain bikes are not permitted in Spring Valley.8. Open fires and camping are prohibited in Spring Valley. Camping is permitted only at the designated site in Salt Run Park with written permission from the Township. Fires are only permitted in the designated fire rings and in the fireplace of the shelter house at Spring Valley. Only dead wood may be collected for fires.9. Consumption of alcohol or drugs on preserve property is prohibited.10. Littering is prohibited. Please dispose of waste in the proper receptacles or take it with you.11. Trails may be subject to seasonal closure to prevent trail damage.	<p>DENISON UNIVERSITY ENVIRONMENTAL PRACTICUM FALL 2008</p>	<p style="text-align: center;"><u>SPRING VALLEY NATURE PRESERVE</u></p>  <p style="text-align: center;"><u>Trail Map and Guidelines</u></p>
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A.4 – Spring Valley and Salt Run Nature Trails Map



Appendix B: Spring Valley Sign

B.1 – Spring Valley Sign Schematic



Appendix C: Trail Maintenance, Rules, Volunteers, and Bridges

C.1 - Trail Maintenance Guide (Page 1)

<p style="text-align: center;">REFERENCES</p> <hr/> <p>Binkby, Robert C. <i>Lightly on the Land: The SCA Trail Building and Maintenance Manual</i>. 1996. The Student Conservation Organization.</p> <p>Conrad, Chris. <i>Trail Training: A Guide for WODC Trail Volunteers</i>. Worcester Out Door Club. www.wodc.org</p> <p>United States Department of Agriculture: Forest Service. <i>Trail Construction and Maintenance Notebook</i>. 2004 Edition. In cooperation with United States Department of Transportation: Federal Highway Administration. http://www.fhwa.dot.gov/download/lep/fpubs/gdR0232839.pdf.</p> <p>Van Akyne, Cathy E. Trail Maintenance, Three Rivers and Republic Ranger Districts - Solicitation 1. FBO daily issue. 24 Oct. 2008. http://www.fbo.gov/feeds/2008/10/October/24-Oct-2008/FBO-01694750.htm</p> <p style="text-align: center;">CONTACT INFORMATION</p> <hr/> <p>Mr. Craig McDonald cmcdonald@lraa.org</p> <p>Granville Recreation Commission www.granvillezoo.org</p> <p>Grace Gordon ggordon1781@hotmail.com</p> <p>Dr. Doug Spieles spieles1@denison.edu</p> <p style="text-align: center;"> Printed on Recycled Paper</p>	 <p style="text-align: center;">Denison University</p> <p style="text-align: center;">Fall 2008 Environmental Practicum Class</p> <p style="text-align: center;">Wondering How to Get Your Organization Involved? Contact the Denison University Program Coordinator to set a date and pick up appropriate tools (740)876-250</p> 	<p style="text-align: center;">SPRING VALLEY NATURE PRESERVE</p> <hr/> <p style="text-align: center;">Volunteer Trail Maintenance Guide</p>  <p style="text-align: center;">DENISON UNIVERSITY, 2008 Compiled by Caitlin Splawski</p>
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C.1 – Trail Maintenance Guide (Page 2)

TRAIL MAINTENANCE AT SPRING VALLEY

What You Need to Know Before You Go

Trail Maintenance can be messy work, so make sure you are dressed appropriately. Long pants and long sleeve shirts are a good idea to protect against scapes, insects, and sunburn. Gloves are also helpful when working with trail tending tools. Lastly, don't forget water to stay hydrated with and lip balm, sunglasses, or personal medications that you wouldn't want to be without.

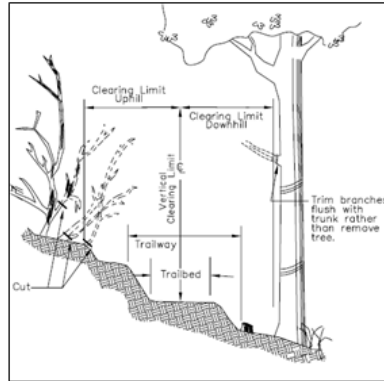
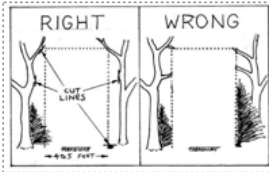
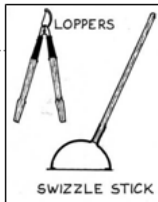
Cleaning and Brushing

Don't Sweat the Small Stuff

In the winter, don't worry about leaves or snow on the trail. Use pruning shears (or loppers as indicated in the illustration) to cut back branches of trees and shrubs that are protruding into the path from up in the air.

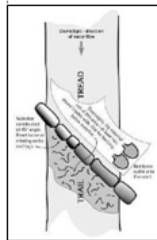
The Little Things in Life

In the summer, concentrate on the small stuff. Use a swizzle stick to remove short vegetation that will be protruding onto the path from the side along the ground.



Leave all organic matter in the forest. Just throw any cuttings that you have made off to the side of the trail preferably onto the ground for faster decomposition.

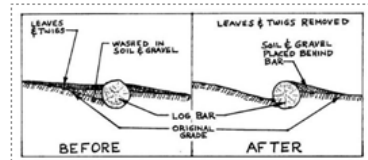
If there are any large trees that have fallen across the path that need a saw or chainsaw to be removed, contact the Township of Granville to have a professional work crew come out and clear the trail.



Drainage and Erosion Control

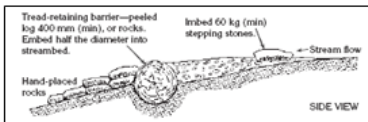
Spring Valley has some structures called Water Bars. Their purpose is to divert water off the trail so that soil from the open path does not erode a way with water that flows down the trail. These structures need to be cleaned as usually as they collect soil, twigs and leaves. The illustration above

shows how water bars should be arranged. In this picture, the water bars are made of a log, however, the water bars at Spring Valley are made with rocks. They serve the same purpose and ought to be handled in the same manner.



Bridges

There are many stream crossings along the trail at Spring Valley. Currently, rock bridges are in place to traverse over these crossings. After a season of snow accumulation and snow melt, it is necessary to make repairs to these bridges so that the trails may remain contiguous. This can be done in Late Spring by stacking rocks in a line spanning the crossing. Wide, flat rocks are the best for sure footing for snow, but braintstorming new ways to build low impact bridges in this area is certainly essential for creating an accessible trail system for all users within Spring Valley.



Trail work done at Spring Valley is done at one's own risk. Spring Valley is a nature preserve under an easement regulated by the Licking Land Trust. Please do not remove anything from the property. Take with you only photos and memories.

C.2 - Current list of Volunteers:

Granville Key Club: Cindy Shaffer: cshaffer@laca.org
Dean of Students: Matt Durst: mdurst@laca.org
Granville Boy scouts: Mr. Grashel: granvilletroop65@yahoo.com
Kiwanis Club Granville Lesa Miller: lesamiller@roadrunner.com
Al Dantzer: Cub Scouts contact, adantzer@msn.com 587-1702
Gina Buckey: g13b@roadrunner.com
Beth Aphorp: sbthorp@yahoo.com
Dixie Floyd: dfloyd@yahoo.com
Craig McDonald: cmcdonald@laca.org

C.3 - Rules for Spring Valley Nature Preserve:

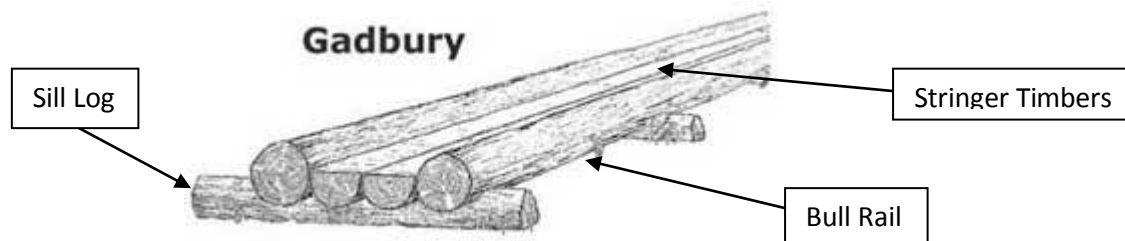
1. The preserve is open daily from dawn to dusk.
2. Motorized vehicles and horseback riding are prohibited.
3. Dogs may be walked on trails but must be on a leash to minimize stress to wildlife. Dogs must be under control at all times.
4. Collection of mushrooms, wildflowers or any organism in Spring Valley is prohibited.
5. No off-trail hiking is permitted in Spring Valley without permission of Granville Township or the Licking Land Trust.
6. Hunting and the discharge of firearms are strictly forbidden.
7. Mountain bikes are not permitted in Spring Valley.
8. Open fires and camping are prohibited in Spring Valley. Camping is permitted only at the designated site in Salt Run Park with written permission from the Township. Fires are only permitted in the designated fire rings and in the fireplace of the shelter house at Spring Valley. Only dead wood may be collected for fires.
9. Consumption of alcohol or drugs on preserve property is prohibited.
10. Littering is prohibited. Please dispose of waste in the proper receptacles or take it with you.
11. Trails may be subject to seasonal closure to prevent trail damage.

C.4 – Suggested Bridge Installations and Design Schematic

Crossing One:

Located on the Proposal Tree trail, the first crossing you come to after entering the path from the opening near the mound-like structures. Since there is a wide stream bed here, we didn't think a conventional bridge was necessary. We found a design that ought to work for most of the crossings called a Gadbury Bridge. It is a simple bridge that is recommended by the Student Conservation Association in their trail maintenance handbook. Our hope is to use only fallen trees from Spring Valley and Salt Run for the wood. Minimal amounts hardware and tools are

needed in the bridge design; it only requires the use of hatchets and axes for construction and then bolts for connecting stringer timbers to the sill logs. Crossing One's bridge would be 42-43 feet in length and about 3 feet wide.



Crossing Two:

On the same trail as the first stream crossing (Proposal Tree), we took a sharp right at the fork and found another relatively flat stream bed. This is the crossing with the bee sign near it. Although the bed was pretty flat, we thought it was likely that this crossing would need some sort of bridge as well. We felt that a similar bridge with handrails would work best for this crossing that is 27-28 feet in length. There would be some hardware, bolts and thread rods, needed for securing the handrails. This type of bridge would allow for more stability at kind of a tricky crossing.

Crossing Three:

This crossing, located on the Oxbow trail had a steep grade to the stream with a rope already in place to help people down. Also, there were essentially two crossings in the actual bed itself because of a sandy bank in the middle of the stream. Also, the second part of the stream was deep and the trail opening on the opposite side was difficult to reach as a result. Our recommendation for this 48-49 foot crossing is to have a little more of heavy duty bridge similar to what the boy scouts built for Salt Run.

Crossing Four:

Continuing on the same trail (Oxbow), this crossing was similar to the others. We thought that this crossing of 34-35 feet did not need a formal bridge for its crossing. We think that it would be suitable to leave the rock bridge that is there now in.

Crossing Five: At the fork in the trail between Oxbow trail and Ridge trail, we went left (crossing the stream immediately next to the trail). We would suggest using the Gadbury Bridge design for this crossing as well.

Appendix D: Environmental Education

D.1 – Environmental Education Activity Guide

Spring Valley Nature Preserve Educational Activity Guide

Dear Environmental Educator,

This guide contains activities that can be used at the Spring Valley Nature Preserve by grades Kindergarten through Sixth grades. These activities fulfill strands of Ohio's required K-6 science grade-level indicators from the academic content standards. Their purpose is to educate children about the natural world and provide a connection between themselves and the environment. This compilation is organized by grade level and by the benchmark that is being fulfilled. They are each adapted from Project series of books that feature activities focused on and in the environment. Each activity is specifically adapted for use at the Spring Valley Nature Preserve. Feel free to adapt each activity to suit your class's needs. Materials may be provided by the Denison University DCA Environmental Education Committee, however availability is not guaranteed.

Please keep safety in mind and follow the Spring Valley guidelines at all times. There are always dangers associated with being outdoors including sharp objects, weather, and poisonous plants. Shelter from the elements is limited so plan activities accordingly. Another important thing to note is that the property is a natural preserve and should be treated accordingly. Thus students should not be destructive to the environment and are not permitted to take things home from Spring Valley. All collected objects should be returned to their original locations after activities.

Enjoy!

- The Environmental Education Group

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GRADE K

Get in Touch with Trees

Grade K

Scientific Inquiry

Use the five senses to make observations about the natural world

Adapted from “Get in Touch with Trees” page 20 from *Project Learning Tree*

Objective and Background: In this lesson, students will learn about using their sense of touch to recognize objects. They will describe a variety of textures and demonstrate how they can use their sense of touch to explore and respond to the environment around them. Prepare for the activity by creating a ‘Mystery Box’ by collecting objects from the ground underneath the trees (different kinds of leaves, bark, seeds, nuts, fruits). Cut a hole in the top of a box no larger than necessary for a hand to fit through.

Materials:

- Box (no smaller than a shoebox)
- Natural objects from the forest floor
- Containers for collecting tree parts
- Large sheet of paper and marker

Procedure

1. Ask the students what is important about the sense of touch. How do they use their sense of touch? What if they didn’t have it? Can they identify objects using only their sense of touch?
2. Give them objects not contained in the ‘Mystery Box’ and have them describe each one. List the adjectives they use on a large sheet of paper.
3. Take the students to the location where you collected the objects and give each one a bag or container. Have each student reach into the mystery box and feel as many of the items as possible. Have them describe the objects they feel. Then have students search for “tree parts” that match those in the ‘Mystery Box.’ Tell them to put the objects they collect into their containers.
4. Bring the students together and ask volunteers to pull one object from the mystery box at a time. Have the students hold up the objects they collected that match the one from the box.

Peppermint Beetle

Grade K

Scientific Inquiry

Use the five senses to make observations about the natural world

Adapted from “Peppermint Beetle” page 23 from *Project Learning Tree*

Objective and Background: In this lesson, students will demonstrate how animals, including insects use their sense of smell to respond to the environment around them. They will also identify the importance of smell in people’s daily lives. Before performing this lesson, flag or mark boundaries in the woods of Spring Valley. Shortly before the students arrive to do the activity “scent-mark” trees that lie within the boundaries. Do this by moistening a cotton ball with flavoring and rubbing it on the bark around the tree trunk at the average nose level of the students. Mark at least one tree for every student (or if the class is large, for every couple students) but do not mark all the trees. Cut lengths of yarn long enough to be tied around the tree trunks, provide several lengths for each student.

Materials

- Small bottle of concentrated flavoring (peppermint, cinnamon, wintergreen, etc.)
- Cotton balls
- Ball of yarn
- Flagging materials or rags to mark boundaries

Procedure

1. Ask students how their sense of smell is important to them. Did they ever have a cold and lose their sense of smell? How did it feel? Did it affect their sense of taste? Explain how taste and scent are related (They are both chemically activated senses. For a substance to be smelled and tasted, it must first be dissolved on the membrane of the olfactory area in the nasal passages). Could your sense of smell save you from dangerous situations (detecting smoke, rotten food)?
2. Ask students how different animals rely on their sense of smell. Give examples (rats, many predators, etc.). Do these animals rely on smell more or less than people? What purpose does smell serve for these animals (helps find food, avoid danger, find a mate, and identify territory)?
3. Tell students to imagine an insect called the “Peppermint Beetle” (name it after the scent you used). This “Beetle” is famous for the scent it occasionally marks on the trunks of trees. Tell the students that they will be working (either individually or in teams) to find the trees this beetle has marked.
4. At the site give each student or team several lengths of yarn. Tell each to use their noses to find trees that the beetle visited. If they find such a tree, they should mark it by tying yarn around it.
5. When all the scent-marked have the students walk the scent trail left by the beetle. Ask the students to consider why the peppermint beetle marked those trees. Could it

be to attract a mate, or define territory? Where might the peppermint beetle's trail lead? To a food source? Its home?

Sounds Around

Grade K

Scientific Inquiry

Use the five senses to make observations about the natural world

Adapted from "Sounds Around" page 26 from *Project Learning Tree*

Objective and Background: Everyone has ears, even animals! We use our ears to hear sounds that help us function on a daily basis. In this lesson students will learn about their sense of hearing and identify sounds at the Spring Valley Nature Preserve.

Materials

- Paper
- markers or crayons

Procedure

1. Explain to the students that we are able to hear sounds because of the structure of our ears.
2. Ask the students about their experiences listening in the dark
3. Have the students sit quietly in a circle in or adjacent to the woods with their eyes closed to listen for sounds
4. After a brief interval, ask them what they are hearing and what they think is making each sound. Have them point in the direction the sound is coming from. You may also ask them to imitate the sounds
5. Have them draw pictures of what they think made the sounds
6. Lead a discussion. What was their favorite sound? Which sound was the loudest? Which sound was the softest?

Hug a Tree

Grade K

Physical Sciences

Describe and sort objects by one or more properties

Adapted from Wilderdom.com

Objectives and Background: Sense of touch is an important sense that we (and animals) use every day. Students will use their sense of touch in this exercise to describe the physical properties of a tree – thus being able to recognize a tree based on its physical properties. Students will then be able to sort the trees from one another showing that there are many kinds of trees

Materials

- blind fold

Procedure

1. Start by walking kids to an area with trees
2. Blindfold one student
3. Make sure the other students are not watching as the blindfolded student is led to a tree
4. The blindfolded student will “hug” a tree
 - a. make sure they feel how big around the tree is
 - b. make sure they feel the bark and leaves if any
5. Then lead the student back to the rest of the students
6. Have the student describe the tree they hugged in size and texture
7. See if the other students can guess what tree was hugged
8. Repeat for several students
9. Discuss if these trees are similar or different

GRADE 1

What's Happening?

Grade 1

Scientific Inquiry

Work in a small group to complete an investigation and then share finding with others.

Adapted from “What’s Happening?” p. 424 from *Project Wet*

Objectives and Background: Work in a small group to complete an investigation and then share the findings with others. Students will develop and conduct a survey. Share the results of the survey to the class. Sometimes when an issue arises in a community, people want to know what other people think or are doing about it. One way to obtain information about people’s thoughts and actions regarding an issue is through a survey.

Materials:

- Paper for surveying and questions
- Pens or pencils

Procedure:

1. Have students divide into groups. Tell them they are going to survey their classmates to find out their interests in the environment.
2. Help the group develop questions associated with interests at in the environment at Spring Valley (What is your favorite thing to do at Spring Valley? etc.).
3. Have the groups administer the survey. Make sure they keep good records of the responses. Each group member should write down the responses given.
4. After a set amount of time, or until all classmates have been surveyed, have the group members discuss the results and prepare a presentation of the results of their survey to the class (an oral presentation is sufficient).
5. After the activity is finished, go on a hike on the Spring Valley trails and look for animals in their habitats – i.e. insects in the forest or invertebrates in the stream.

The Shape of Things

Grade 1

Scientific Inquiry

Use oral, written and pictorial representation to communicate work

Adapted from “The Shape of Things” p. 17 from *Project Learning Tree*

Objective and Background: In this lesson students will identify common shapes appearing in natural and built environments. To prepare, you will need to draw a circle, square, triangle, rectangle or oval on separate slips of paper. Make enough slips for every student to have one.

Materials

- Slips of paper (about 3” by 3”)
- Clipboards or writing tablets with paper and crayons or pencils (or cardboard and paper clips)
- Sack or other container

Procedure

1. Begin the activity by asking students to name something round that they use every day. Also ask them to name everyday objects that are shaped like squares, triangles, rectangles, or ovals.
2. Put the slips you made earlier into a sack or container and have each person pick one. Tell students to keep the identity of their shapes a secret
3. Tell students they’ll take a walk to look for shapes in the environment. During the walk each person will focus on his or her shape. When the students see a natural object with this shape, they should draw a picture of the object. Before going on the walk, make sure that each student has a crayon or pencil and paper.
4. Take the students on a leisurely walk on one of Spring Valley’s trails. Stop as needed so the students can draw objects with the appropriate shape. Tell the students not to point out their objects to others; you will compare notes later on the different objects everyone saw.
5. When you come back from the walk, ask for volunteers to discuss which shape they were looking for. Ask the volunteers to show all the pictures they created during the walk. Did any of the other students with that shape observe additional objects?
6. Talk about each of the remaining shapes in turn, allowing them to describe what they saw and to share their drawings.

Organisms Have Basic Needs

Grade 1

Life Sciences

Explore that organisms, including people, have basic needs which include air, water, food, living space and shelter

Adapted from “Oh Dear!” page 146 from *Project Wild*

Objectives and Background: Good habitat is the key to wildlife survival. A population will continue to increase in size until some limiting factors are imposed. Limiting factors contribute to fluctuations in wildlife populations. Nature is never completely in “balance”. Students will be able to identify and describe food, water, and shelter as three essential components of habitat. They then will describe the importance of good habitat for animals

Materials

- writing materials if wanted
- chalkboard or flip chart (large paper) if wanted
- something to mark two lines with (string, etc)

Procedure

1. Review the essential components of habitat with the students (food, water, shelter, space. This activity emphasizes food water and shelter)
2. Have the students count off in fours and separate according to their number
3. Mark two parallel lines on the ground 10-20 yards apart and have the ones line up behind one line and the rest line up behind the other
4. The 1s are deer who need good habitat in order to survive
 - a. when they need food, they should clamp their hands over their stomachs
 - b. when they need water, they should put their hands over their mouth
 - c. when they need shelter, they should hold their hands together over their head
 - d. the deer can choose to look for any one of its needs during each round or segment but they cannot change during rounds
5. The 2s, 3s, and 4s, are food, water, and shelter respectively. take out - (not assigned, they can choose)
 - a. They will represent what they are similarly to 4 a-c.
6. All players line up on their lines with their backs to the students at the other line
7. Have the students make their signs but don't turn around yet! Encourage the deer looking for their needs to choose a different need from the person standing next to them.
8. When all students are ready, count to 3 and on 3 the students turn to face each other, holding their signs clearly

9. When deer see what they need, they run to it, holding their sign until they reach a habitat component with the same sign
10. They will then take the student with the matching habitat component back to the starting line of the deer
 - a. this represents the deer's successfully meeting its needs and successfully reproducing as a results
11. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat
12. This can be repeated for about 15 rounds before a discussion should be led about what the students observed
 - a. discuss if any trends were observed such as lots of food but little water, etc

GRADE 2

Thirsty Plants

Grade 2

Life Sciences

Investigate the different structures of plants and animals that help them live in different environments (e.g., lungs, gills, leaves and roots).

Adapted from “Thirsty Plants” page 116 from *Project Wet*

Objectives and Background: The objective of this activity is to explain how water is transported through plants and compare different animals. Plants need water to live – to transport necessary nutrients to various parts of the plant. But how does water get from the ground all the way to the top of the plant? Some plants do not require as much water as other plants – Rhododendron and Wintergreen are two examples of plants that can survive on little water. Plants like these typically have smaller, waxy leaves, with deep root systems.

Materials:

- paper towel tube
- paper that is cut into a series of connecting links to resemble a chain
- straws
- cups with water
- tape

Procedure:

1. Have the students consider a 20-foot tall tree, how do its leaves get water when they are 20-feet in the air? Do leaves just get water when it rains? Is there a big straw in the middle of the plant? Have the kids try to put together two or three straws and drink water out of a cup.
2. Take the paper towel tube and series of connected paper links and slowly bring a paper circle out the top of the tube and tear it off. Explain that water starts from the ground, gets brought up through the roots all the way to the top of the tree and through its leaves. Eventually the water evaporates into the air (represented when a circle is torn off).
3. Ask the kids what kind of plants live in the desert, in the rain forest, in Ohio. What are the characteristics that plants that live in the desert have that plants in the rainforest do not have?
4. Take the kids on a little hike on the Spring Valley trails. Have them look for plants that look like they do not need as much water to survive (small, waxy leaves) and have them look for plants that appear to need a lot of water to survive (big, soft leaves).
5. Come back together as a class and talk about what the students saw.

Trees as Habitats

Grade 2 – Life Sciences

Explain that animals, including people, need air, water, food, living space and shelter; plants need air, water, nutrients (e.g., minerals), living space and light to survive. Compare the habitats of many different kinds of Ohio plants and animals and some of the ways animals depend on plants and each other.

Adapted from “Trees as Habitats” page 102 from *Project Learning Tree*

Objectives and Background: In this lesson, students will describe ways animals and plants depend on trees for survival, and in turn, influence trees. Students will identify interrelationships between the organisms using a tree.

Materials:

- One copy of *Goodnight Owl!* By Pat Hutchins
- Leaves, twigs, bark, fruit, and nuts that show signs of animal life (chewed, tunnels, scrapings, egg cases, webs, galls, moss, lichen)

Procedure:

1. Ask the students: What animals have you seen in or on trees? What were the animals doing in the trees (eating, making a nest, resting, etc.)? Explain that a habitat is a place where a plant or animal gets all the things it needs to survive (food, shelter, water, place for raising offspring).
2. Read the story *Goodnight Owl!* aloud to the students. Ask them to name the animals that visited the hollow tree. What sounds did the animals make? What was each of them doing there? How did they use the tree?
3. Show the collection of signs of plant or animals life to the students. Discuss each sign with the students. Tell them that these examples show how animals and other plants depend on trees, and that trees provide a habitat for these plants and animals.
4. Lead students to the wooded area and have them describe what they see living on tree trunks and branches. Give them plenty of time to make observations. Ask these questions: Can you spot bird nests, chewed leaves, or other animal signs? Do you see any animals climbing around or in the tree, or flying to and from it? Do you see any other plants growing on the tree?
5. Have students look on the ground around the tree for fallen leaves, twigs, bark, seeds, fruit, or nuts that might also show signs of animal or plant life. Do students find any of the examples that you showed them earlier?
6. Discuss the examples you found. Have students try to explain why they found those particular examples where they did in order to compare habitats.

Generating Explanations

Grade 2

Scientific Inquiry

Recognize that explanations are generated in response to observations, events, and phenomena.

Adapted from “Learning to Look, Learning to see” page 62 from *Project Wild*

Objectives and Background: Students will be able to describe differences seen in an environment as the result of observation and to give reasons for the importance of looking closely at any environment. Students will be able to understand that from these observations, explanations can be made

Materials:

- note pad with writing materials (optional)

Procedure:

1. Have the students make generalizations about the a stream such as water flows fast or slow or where it might flow fast or slow or the temperature, etc
2. Go over what making an observation means (seeing, hearing, listening, smelling..etc)
3. Bring the students to a stream
4. Have them sit and watch the stream for a few minutes
5. Have them remember everything that can see in and around the stream
6. Go over the five senses and make sure they use them all. Then record what they find on their note pads for five minutes.
7. Bring students back together and talk about what they observed. Record suggestions somewhere visible.
8. Talk about the generalizations that were previously made and see if they can relate their observations to their thoughts
9. Discuss how observations create explanations

Wetland Soils in Living Color

Grade 3

Earth and Space Systems

Investigate the properties of soil (e.g., color, texture, capacity to retain water, ability to support plant growth).

Adapted from “Just Passing Through” p.166 and “Wetland Soils in Living Color” p.212 from *Project Wet*

Objective and Background: Investigate the properties of soil (e.g., color, texture, filtration properties). Soil acts as a filter for water. Water that has sediment and debris is filtered through spaces created by soil, plant roots, and vegetative matter. Soil thus helps purify water. Color is a key characteristic in classifying soils. An example of an area that can be classified by its soil colors is a Wetland. Wet organic soils look like black muck or dark brown or black peat. Decomposed plants and animals contribute to the color of organic soils. Soils lacking organic material are classified as mineral and are usually found deeper under the surface. Mineral wetland soils can range from neutral gray to greenish or bluish gray or gray, with splotches of brown, orange, red, or yellow. In addition to color, a soil’s texture and degree of wetness, along with other qualities like smell and the presence or absences of living matter, provide clues to its classification.

Materials:

- A pot of soil
- Container of water including shredded paper
- Shovel

Procedure:

1. Help students to recognize how soil acts like a filter. Pour water containing shredded paper (representing sediment) into a pot of soil and note the water that drains out the bottom. Students should see that most of the sediment has been removed because the paper pieces remains on the top of the soil and the water drains out the bottom.
2. Take the students to the stream in Spring Valley. You should already have a hole about 2 feet deep dug by the stream (this may take a while). Make sure to refill the hole before leaving.
3. Remove soil samples about the size of Ping-Pong balls from several different depths.
4. Show students three soil samples. Ask the students to describe the three types of soils (color, texture, smell).

5. Explain that color, texture and smell provide important clues used by scientists when classifying soils.
6. Different locations have different types of soil. Explain that by classifying soils scientists can most likely predict where the soil came from.
7. For a finishing activity, gather the students and put them into groups of three. Have one student per group act as the plant by standing and the other two students act as soil by grabbing the plant's legs (one leg per student). First have the soil loosely hold onto the plant's legs (roots). Can the plant move? Then have the soil grab the plant's legs tighter. How well can the plant move now? Finally, have the soil grab the plant's legs as hard as they can (without inflicting pain). How well can the plant move now? This is simulating how a plant can live in different environments that soil provides. Have the students discuss the positive and negative implications of loose vs. packed soil.

Soil Stories

Grade 3 – Earth and Space Science

Observe and describe the composition of soil (e.g., small pieces of rock and decomposed pieces of plants and animals, and products of plants and animals).

Adapted from “Soil Stories” page 297 from *Project Learning Tree*

Objectives and Background: In this lesson students will investigate the physical characteristics of various soils. Try to find spots at Spring Valley where soil quality will differ (near water, in the woods, in the field).

Materials:

Each team will need:

- Small plastic bag
- Trowel or shovel
- Toothpicks
- Sheet of white paper or paper plate
- Copy of student page and pen/pencil
- Large jar with lid
- Water

Procedure:

1. Ask students what plants get from soil (air, water, nutrients, support). Do different plants have different soil needs? (Yes. Some need dry or wet soil, some need acidic or alkaline soil)
2. Tell students that you will divide into teams and that each team will analyze a different soil sample.
3. Distribute the “Soil Investigation” page, bags, and digging tools to each team.
4. Have each team collect a sample of soil (at least half a cup). You can either assign locations or let them choose their own but have different teams collect from different locations.
5. Have teams transfer their soil to a sheet of white paper or plain paper plate. Have them use a toothpick to examine their soil and sort the soil particles into different materials. Have them answer questions one and two on the student page.
6. Have students make a “soil shake” by placing one-half cup of their soil into a jar with a lid and add about two cups of water. Ask them to predict what will happen if they shake the closed jar and let it settle for a while (question three part one).
7. Have students close the lid and shake the jar hard for a couple of minutes. Allow the soil to settle for as long as possible (if you are going to be doing multiple activities, do this one first and come back to it).

8. Students will be able to observe the layers that have formed in each jar. Since larger components settle out first, the soil particles will fall out in layers. Pebbles first, then sand, silt, and clay. Other organic materials (leaves, twigs, stems) will float or be suspended in the water.
9. Have students draw a picture of the layers formed by their sample (question three, part two) and share their results with the rest of the teams.

Soil Investigation

1 Describe where your soil is from

Draw a picture that shows where you got it

What was growing there?

What else did you notice?

2 Describe the soil

What color is it?

How does it smell?

How does it feel?

What do the largest soil particles look like? The smallest?

3 Describe your soil shake

Before the shake, what do you think will happen?

After the shake, draw what you see

Animal Structure and Function

Grade 3

Life Sciences

Relate animal structures to their specific survival functions (e.g., obtaining food, escaping or hiding from enemies).

Adapted from “Quick and Frozen Critters” page 122 from *Project Wild*

Objectives and Background: Students will be able to discuss predator prey relations, including adaptations and describe adaptations in predator/prey relationships. Prey behaviors can include: signaling to others, flight, getting cover (temp. shelter or camouflage), and freezing (imitates physiological shock in the animal). Predators use their speed as well as claws and teeth.

Materials:

- Food
- Tokens, 3 per student
- Labeling devices to mark predators
- Hula hoops or markers to serve as temporary shelter
- Other markers for camouflage or other adaptations

Procedure:

1. Create a pair of animals that are predator prey
2. Identify students as either predator or prey with 1 predator for every 4-6 prey
3. Using a playing field, identify one end as “food source” where the tokens are located and one end as shelter
4. 4-5 hula hoops or other markers are randomly placed on the playing field to indicate temporary shelter
5. Give each predator/prey a different adaptation
 - a. Prey
 - i. One may have camouflage so if they freeze they will not be seen
 - ii. One may be fast enough to make it to the temporary shelter
 - iii. May remain frozen or hidden for as long as they like, they just need to have 3 food tokens by the end of the round
 - b. Predator
 - i. One may have to walk but can use a longer sock to help hit prey
 - ii. One may run
6. At the start of each round, the prey move from their shelter to food source where they will retrieve one food token and return it back to their primary shelter
 - a. In order to survive, prey must obtain 3 food tokens

7. The predators are randomly distributed around the playing field at the beginning of the round
 - a. They may tag only moving prey that have not taken shelter or reached the food source
 - b. Once a prey is tagged they are taken to the sideline
 - c. Predators must capture 2 prey in order to survive
8. Each round may be 5-7 minutes with several rounds to allow for switching up of adaptations and predator and prey roles
9. At the end discuss the ways prey escaped capture (which were easiest and most effective)
 - a. How did predators capture prey (which were best)
 - b. In what ways are adaptations important to both predator and prey?

GRADE 4

Thirsty Plants

Grade 4

Earth and Space Sciences

Investigate how water changes from one state to another (e.g. freezing, melting, condensation and evaporation)

Adapted from “Thirsty Plants” page 116 from *Project Wet*

Objectives and Background: Investigate the various states of water (freezing, melting, condensation, evaporation). Water is an essential element in life and is very unique. The various states of water of water include evaporation (when water changes from liquid state to gas (vapor)), condensation (when water changes from a gas (vapor) to liquid), freezing (when water changes from a liquid to a solid (ice)), and melting (when water changes from a solid (ice) to a liquid).

Materials:

- Ice
- Clear plastic bag and twist tie (or string) for each group
- Scale (if sensitive enough to weigh a plastic bag)
- Tweezers

Procedure: This activity is best done on a sunny day after a rain storm.

1. Divide the students into groups of two or three. Give a plastic bag to each group. Have each group weigh the plastic bag. If a weight is unable to be recorded, simply have the students describe the appearance and qualities of the bag.
2. Take the students on a mini-hike to find a location where there are a trees, shrubs, or small plants with leaves at a height the group members can reach. Assign each group a plant. Watch out for poison ivy!
3. Have each group carefully place the plastic bag around a limb with leaves on it. Be careful not to break any of the leaves off. A limb that is in the sun is the best. Have the group count how many leaves are on the limb. Tie the bag on the limb with a twist tie or piece of string.
4. If there are “x” amount of leave on this limb, can we estimate how many leaves are on the tree?
5. Have the students gather around in a group. Show them the ice and ask them to describe what state the water is in (solid). Take the ice in your hand and have the ice melt in your hand. The ice can be passed around the students so that they feel the water. Or if it is a sunny warm day, lay the ice on the ground where the class can see

- that the ice is melting. Ask the students what the ice is doing (melting) and ask them what happened to the water to make it ice (it froze).
6. After about 30 minutes has passed, have each group remove their bag from the limb (carefully) at the same time. If leaves or debris are in the bag, remove them with tweezers trying not to remove any moisture. Have them weigh their bag or have them observe the bag. What is in the bag (condensation)? If the bag had not trapped the water, what would have happened? Where would the water have gone? Explain evaporation.
 7. If a scale is available, have each group measure the amount of moisture accumulated in the bag: $\text{weight gain} = \text{total weight} - \text{starting weight}$

Field, Forest, and Stream

Grade 4 – Scientific Inquiry, Scientific Ways of Knowing

Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume, temperature and area in metric and English units.

Differentiate fact from opinion and explain that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.

Adapted from “Field, Forest, and Stream” page 203 from *Project Learning Tree*

Objective and Background: In this lesson students will formulate hypotheses, make careful observations and compare three different ecosystems. An ecosystem consists of all living and non-living components in a geographical area that interact to form a stable system. The three ecosystems used in this activity will be one in the tree-less area at the entrance of Spring Valley, one in the woods, and the stream.

- You will need to make photo copies of the “Team Chart” to pass out.
- Select your three locations before the students arrive. Do your best to choose sites that vary in sunlight, air temperature, moisture, wind, topography, and number and type of plants and animals there.
- Don’t forget to check for safety hazards (deep holes, sharp objects) and make sure the students know to appropriately treat nature.
- Before starting the lesson see that the students know how to work equipment like a thermometer and compass (directions for measuring wind direction below)

Materials:

- Photocopies of Team Chart
- Pens to record observations
- Photographic light meter or photosensitive paper (if available, but not necessary)
- Thermometer
- Strip of paper (for measuring wind)
- Bottle of tap water

Procedure:

1. Talk to the students about their favorite places and ask them to describe why they like them. Have them name nonliving things that make the place enjoyable. Explain what an ecosystem is and how living and nonliving things relate to each other in an ecosystem.
2. Divide the students into teams and pass out the chart:
 - Soil** – Students will determine soil moisture by feeling it, will also make note of other characteristics of the soil (texture, color, smell) and whether they find anything living in it
 - Sunlight and Wind** – Students will determine wind movement and the amount of sunlight reaching the ground at each site. For wind, a student can hold a strip of paper away from his or her body and observe if it hangs limp or blows at an angle,

they can use a compass to determine the direction of the wind. See step six for an explanation of how to do this. If a light meter or photosensitive paper are available, they can be used to measure light, otherwise the students can use relative terms (shady, dark, medium light, bright).

Temperature – Students will measure each site’s temperature at ground level, in the soil and at one yard above the ground. At the stream ecosystem, students will measure the temperature at the surface of the water, below the water, and at one yard above the water.

Lay of the Land – Students will determine whether the sites are flat or sloped and record other land features. This team will also find out which way the water flows from the site by pouring water onto the ground and using a compass to determine which direction it goes.

Plant Life – Students will observe the kinds of plants at each site. They should record the most common plants in each area.

Animal Life – Students will record the kinds of animals at each site. They should look for evidence of animals like tracks, burrows, or chewed leaves.

- Ask each team to make hypotheses for what they expect to find when they go to the sites. If there are not enough students to make up all of these teams, consider combining groups or doing the activities as a class
3. Lead the students to each location in turn and give them enough time to make their observations.
 4. Come back together as a group and discuss findings and if they differed from the hypotheses. The students should use the information from other groups to fill out their own charts. You may also want to create a large class chart with all the information.
 5. Ask the following questions:
 - Which ecosystem had the greatest number of plants? Animals? Which had the least of each? How can you explain this difference?
 - Which site had the highest air temperature? The lowest? The most wind? The least?
 - Which has the wettest soil? The driest?
 - Do plants seem to affect light intensity, air temperature and soil temperature?
 - How do you think water influences soil temperature, air temperature, and soil moisture?
 - What relationship does light seem to have with air temperature? With soil moisture? With plants
 - How might water flow affect soil moisture and plants?
 - Which of the elements studied seems the most important for determining the character of the environment at each site? Why?
 6. How to Measure Wind Direction Using a Compass
 - Turn your body so that you feel the wind at your back
 - Hold the compass flat at waist level
 - Turn the compass without turning your body until the red arrow matches up with the north arrow on the base of the compass
 - The direction of the wind is the letter or number closest to your bellybutton

Team Members:

Ecosystem	Site 1	Site 2	Site 3
Soil Moisture: wet moist or dry Texture, color, smell Organic matter and organisms			
Sunlight/Wind Shady, dark, medium light, bright Amount of wind Direction of wind			
Temperature At ground level At 1” into soil/water At 1 yard above ground			
Lay of the Land Flat or sloped Land features Direction of water flow			
Plant Life Most common plants Where they grow relative to others			
Animal Life Animals seen Animal evidence (tracks, burrows, chewed leaves)			

Good Buddies

Grade 4

Life Sciences

Describe how organisms interact with one another in various ways.

Adapted from “Good Buddies” p. 104 from *Project Wild*

Objectives and Background: The students will be able to define symbiosis, commensalism, mutualism, parasitism, and exploitation (include exploitation in grade 6). Students will identify animals that live in each type of symbiotic relationship. When two species or organisms live in close physical contact with each other, their relationship is symbiotic, or at least one organism directly benefits from its close association with the other organism. Commensalism is a relationship in which one species derives food or shelter from another species without seriously harming that organism or providing any benefits in return. Mutualism is a reciprocal relationship in which two different species live in a symbiotic way where both species benefit and are dependent upon the relationship. Parasitism is a relationship between two species in which one species nourishes itself to the detriment of the other species. Exploitation is a relationship in which one species takes advantage of the other species providing a negative benefit for the other species (only include in grade 6).

Materials

- a set of cards containing 15 pairs with various aspects of nature that interact in some way found at the end of the lesson(ex: deer and tick or cow and grass) (only include exploitation in grade 6)
- each pair is in a different color to help students make sure they are right

Procedure

1. Prior to doing this activity, go over the definition sheet on the next page with students. Make sure they are somewhat familiar with each term.
2. Pass out all cards so that only pairs have been passed out (include yourself if there is an odd number of students).
3. Have students walk around trying to find their match based on whether or not they might interact (and whether or not they have the same color).
4. Once all pairs have been found, have students identify why they chose their partner and what type of specific interaction they might have.
5. Talk about advantages and disadvantages of the relationship and what would happen if one of the two were missing.
6. Take a hike and see if students can find examples of these types of relationships.

Definition Sheet for “Good Buddies”

Symbiosis:

When two species or organisms live in close physical contact with each other their relationship and at least one organism directly benefits from its close association with the other organism

Commensalism:

A relationship in which one species derives food or shelter from another species without seriously harming that organism or providing any benefits in return

Ex: sea anemone and clown fish or forms of mimicry (monarch and viceroy)

Mutualism

A reciprocal relationship in which two different species live in a symbiotic way where both species benefit and are dependent upon the relationship

Ex: any plant with berries and an animal that eats that plant and therefore disperses the seeds

Parasitism

A relationship between two species in which one species nourishes itself to the detriment of the other species

Ex: hookworms and lice

Exploitation

A relationship in which one species takes advantage of the other species providing a negative benefit for the other species (only include in grade 6)

Ex: any animal that eats another animal

GRADE 5

A-maze-ing Water

Grade 5

Science and Technology

Explain how the solution to one problem may create other problems

Adapted from “A-maze-ing Water” p. 219 from *Project Wet*

Objectives and Background: Describe urban forms of pollution and provide reasons why people should monitor what they put on their lawns or in streets. Spring Valley is surrounded by housing developments. When it storms, the water is diverted to storm water systems that receive little or no treatment before flowing into a stream or body of water. Environmental agencies found that water draining off lawns, sidewalks, driveways, parking lots and streets carried significant amounts of pollutants. These pollutants included fertilizers, motor oil, litter, pesticides, animal waste, and other contaminants. Receiving waters were degraded and aquatic plants and animals were affected. It is important to monitor what we use in our homes because pollutants can get into streams and bodies of water that negatively affect the environment and plant and animal life.

Materials:

- a can or water bottle labeled “chemicals” or “oil”
- A long piece of yarn or rope
- Scotch tape or sticky-notes

Procedure:

1. Show students a can or bottle labeled “chemicals” or “oil”. Tell students that you need to dispose of the chemicals and plan to dump them either in the street or in Spring Valley. Is this a good idea? Have them describe what they think will happen to the waste material.
2. Discuss how water is used to clean things, such as the surface of a table after a spill. Relate how rainwater washes the outdoors. Explain that as it flows over plants, soil and sidewalks, it picks up and carries away soil and other materials. Inform students that cities use water to clean the waste from city streets and sidewalks. Often the water goes down storm drains, collects in pipes, and flows to a river or a treatment plant.
3. Take the yarn and place it on the ground like a maze. The maze represents underground pipes that collect and transport surface water that has flowed down storm drains. Have students run the maze. Inform them that they are water flowing through the drainage pipes to the river or treatment plant.
4. Discuss sources of water that run into the storm sewer system (streets, lawns, parking lots, etc.) What might this water carry? (Oil from cars, fertilizers, litter).

5. To simulate surface water transporting pollutants into drainage pipes, have several students' position themselves along edges of the maze. They represent storm drains and the contaminated water flowing through them. They should hold pieces of scotch tape or sticky-notes to symbolize pollutants. When other students run through the maze, the students representing storm drains stick pieces of tape or sticky-notes to the maze runners to represent contaminated water mixing with the water (that may or may not be clean) flowing through the system. Allow students to take turns playing different roles.
6. Discuss what happens to this dirty water. What if it flows into the river? Can treatment plants process all the waste? Have students summarize why they should not litter.
7. To represent a treatment system, have two students stand at the exit of the maze. When the students representing dirty water pass them, the two students representing the treatment system tries to take the tape or sticky-notes off of the students (removing pollutants from water before it goes into the river). What are the students' feelings about the quality of this water passing into the rivers? (Make sure to pick up any tape or sticky-notes as to not litter).
8. Discuss how solutions such as fertilizers, cleaning chemicals off of streets (etc.), have negative impacts on the environment and can be damaging to animal and plant life. Some "solutions" can be negative to human health too. Discuss the importance of thinking through solutions and what possible effects of some solutions are.

Planet Diversity

Grade 5 – Scientific Inquiry

Evaluate observations and measurements made by other people and identify reasons for any discrepancies. Use evidence and observations to explain and communicate the results of investigations.

Adapted from “Planet Diversity” p. 45 from *Project Learning Tree*

Objective and Background: In this lesson students will investigate the diversity of plants and animals on a small plot of land. They will compare their data with others to conclude what factors influence the abundance or lack of diversity. They will also explain the value of a diversity of life forms in a particular ecosystem. Before doing the activity, mark several different plots of land from 2 feet x 2 feet to 4 feet x 4 feet. Try to find areas where study plots will differ from each other in terms of plant type, sun or shade, etc.

Materials:

- Measuring tape or yardstick
- String or ribbon for marking plot boundaries
- Clipboards or writing tablets
- Copies of “Diversity Data” page and pencils
- Tweezers and magnifiers (optional)
- Materials for presentation (optional)

Procedure:

1. Ask students what they think the word “diverse” means and have them share their thoughts about why “diversity” might be a good thing – both in nature and in human communities
2. Tell students to imagine that they are scientists from a planet called Deevoid. Deevoid has a similar atmosphere, climate, and mineral composition to Earth, but has very little diversity of life with only a few different species. Deevoid scientists have long hypothesized that the planet Earth is rich with a variety of life forms. To test this hypothesis, several teams of scientists have been sent out on an exploratory mission to Earth. By studying the life on earth, the scientists hope to discover ways to improve the biodiversity and the quality of life on their own planet.
3. Explain that each team of scientists will study a plot for its variety of life forms. They will record and describe all life forms they find. They can also draw conclusions about the diversity of life on earth.
4. Explain that when the scientists arrive back on Deevoid, they will present their findings at a scientific conference. Since Earth organisms are completely unknown to their colleagues on Deevoid, the scientists must be careful to make detailed observations while on Earth. They will want to record detailed information about what the organism looks like, its size, where they found it, how it behaved, etc.

5. Divide the students into teams of four and assign each team a study plot and hand out data sheets.
6. Each team should first answer the first two questions on the study sheet.
7. Allow students ample time to examine their plots and record their data.
8. Back on Deevoid students should hold a conference to discuss the Earth expedition. Give each team time to prepare its presentation. Teams should describe the kind of plot they were sampling (field, wooded plot) and how their initial predictions compared with what they actually found.
9. After considering all the data and making comparisons, students should try to draw conclusions about what factors influence the abundance or lack of biodiversity. What problems might be faced in areas lacking in biodiversity? Did the mission to Earth provide enough data for teams to draw conclusions? What future study missions do the teams recommend?
10. Have the students brainstorm ways that biodiversity on Earth benefits the lives of its people. How might the people of Deevoid begin to improve their planet's biodiversity for the future? Answers will vary, but could include ideas such as increasing the abundance and variety of vegetation, improving the soil, and so on. What additional information would they like to have about Deevoid to help solve this problem?

Diversity Data

Describe your study plot's location:

Predict what life forms (if any) you expect to find there:

Record the plants and animals you see. Draw a picture or use words to describe each different kind. Tally or estimate the number of each kind you see in your plot

Plants and Fungi	Animals

What's for Dinner?

Grade 5

Life Sciences

Explain how almost all kinds of animals' food can be traced back to plants.

Adapted from "What's for Dinner?" p. 48 from *Project Wild*

Objectives and Background: Students will be able to generalize that all animals, including people, depend on plants as a food source, either directly or indirectly. Plants ultimately support all forms of animal life either directly or indirectly. Omnivores eat both plants and animals. Vegetarians eat plants and plant products. When you eat animal products, you are indirectly relying on plant sources. These animals rely on plants as their food source.

Materials

- Writing/drawing materials

Procedure

1. Have students make a list of what they had for dinner (or they can make up a dinner of their choice).
2. Have the students work in groups to analyze where their food comes from and have them trace all foods back to plants.
3. Create a flow diagram or chain which shows major sources of each food. An example is included at the end of this activity.
4. Take on hike! On the hike, have students identify plants that would potentially end up or have a factor in a meal and explain how they think it will end up there.
5. Be sure to talk about soil, water, and sun as they are necessary to plants too!
6. Look at what plants we depend on more than others: are they found naturally surrounding you?

Procedure:

1. Inform the students that they just inherited a piece of riverfront property and a million dollars. Have them list what they could use the land and the money for.
2. Pass out “pieces” of property and drawing pens and pencils. Explain that the blue is water and the blank space is land they own. They have one million dollars to develop their land as they wish. They can farm or ranch; build resorts, homes, factories, or parks; plant forests, log, mine, whatever they like.
3. When students have completed their drawings, ask them to look in the upper left-hand corner of their property for a number. Explain that each piece is actually a part of a puzzle. Starting with number one, have students assemble their pieces. They will construct the stream pathway and adjacent land area in proper order. (The ones should face each other, with the twos next to them, and so forth.)
4. Have students describe how they developed their land and how they used water. They should identify any of their actions that polluted or added materials to the waterway.
5. Have the students find a stick or small pebble and have them place it on their property to signify their contributions to the river.
6. Tell students to take their items and line up in the same order as their pieces of river front property. They are going to pass their pollution pieces downstream. Have them announce what kind of pollutant they are holding before they pass it on. The ones will pass their items to the twos; the twos will pass everything to the threes, and so on, until the last students are holding all the items.
7. Discuss the activity. How did those students toward the middle or end of the river feel? What about their property use plans? Could a student downstream be affected by the actions of a student upstream? Could upstream users alter the water quality of those downstream? How would relationships between upstream and downstream users be affected?
8. Have the students think of some major North American Rivers (e.g., Mississippi, Missouri, Rio Grande, Colorado). Where do they originate and end? How many states touch the rivers? Are there cities along these rivers? Do you think people upstream or downstream have better attitudes about the water they receive from the river? In other words, is the water upstream more likely to be higher quality?

Have Seeds, Will Travel

Grade 6 - Life Sciences

Recognize that an individual organism does not live forever; therefore, reproduction is necessary for the continuation of every species. Traits are passed on to the next generation through reproduction.

Adapted from “Have Seeds, Will Travel” p. 185 from *Project Learning Tree*

Objective and Background: In this lesson student will learn about seeds by sorting and classifying them to determine how they are dispersed. The students will be collecting seeds but you should bring in a collection of your own in case they do not find a wide variety (autumn is the best time for collecting seeds)

Materials:

- Variety of seeds that you have gathered
- Cups to hold the seeds the students gather
- Large sheet and marker to record student answers
- Blanket (optional)

Procedure:

1. Ask students what seeds are and what they do. Ask for examples. Talk about the things a seed needs in order to grow in to a plant (sunlight, air, water, and nutrients). Tell the students they will learn more about seeds by gathering and sorting them.
2. Pass out cups to the students and ask them to gather seeds from the floor of the wooded area at Spring Valley. Another method for gathering seeds is to drag a blanket or other piece of fuzzy cloth through the area.
3. Put all the collected seeds into a class collection. Divide students into groups of two to five and give each group an assortment of seeds. Ask them to examine their seeds and invent a system for sorting or classifying them.
4. Lead a discussion about the structure and function of seeds. Ask the following questions:
 - What are seeds? (A seed is a “plant egg.” It contains a baby plant and a supply of baby plant food wrapped in protective covering. You may slice open a plant with a large seed, such as an avocado to show its parts)
 - Where do seeds come from? (The plant's ovary, or female part, is located in its flowers or cones)
 - Is there a reason for so many different kinds of seeds? (Every type of plant has a special type of seed designed for the plant's particular habitat and method of distribution).
5. Ask students why it might be important for seeds to be dispersed away from parent plants. They should share different ways they have noticed plants dispersing their seeds. Write the ideas on a large sheet of paper. You may need to mention particular seeds to provoke more ideas. Ask them if any of the ways they have observed are

similar. Compile groups of similar dispersal systems so the class ends up with five to eight categories

Example Categories:

- Floats on air – dandelion, cottonwood, cattail
 - Flies through air – maple, ash, poplar
 - Floats on water – mangrove, coconut, cranberry
 - Bounces or rolls – acorn, pecan
 - Eaten by animals – cherry, peach, apple
 - Stored by animals – acorn, hickory, beech
 - Sticks to animals – cocklebur, wild barley
 - Thrown – violet, impatiens, lupine
 - Released or opened by fire – Lodgepole pine, Jack pine
6. Ask students to group their seeds according to the categories they have identified
 7. Discuss the following questions:
 - How do a seed's shape and size affect its dispersal?
 - What other parts of the plant help it reproduce? (Flowers with male and female parts, and fleshy fruits that encase seeds)
 - Why is it important for seeds to be dispersed in different ways? (Plants have different requirements that are served best by different seed-dispersal systems)
 - How far can seeds be dispersed? (Seeds can glide on the wind for several miles, float on the water for hundreds, or travel on a bird for thousands of miles)
 - Can some seeds go farther than others? (Yes) How is distance important? (It reduces competition for a plant's needs in a particular area)
 - What value might seed dispersal have for wildlife or humans? (food, medicine)
 8. Now that the students know the processes of seed dispersal and how difficult it may be, have them return the seeds to the wooded area.

Good Buddies

Grade 6

Life Sciences

Describe how organisms interact with one another in various ways.

Adapted from “Good Buddies” p. 104 from *Project Wild*

Objectives and Background: The students will be able to define symbiosis, commensalism, mutualism, parasitism, and exploitation (include exploitation in grade 6). Students will identify animals that live in each type of symbiotic relationship. When two species or organisms live in close physical contact with each other, their relationship is symbiotic, or at least one organism directly benefits from its close association with the other organism. Commensalism is a relationship in which one species derives food or shelter from another species without seriously harming that organism or providing any benefits in return. Mutualism is a reciprocal relationship in which two different species live in a symbiotic way where both species benefit and are dependent upon the relationship. Parasitism is a relationship between two species in which one species nourishes itself to the detriment of the other species. Exploitation is a relationship in which one species takes advantage of the other species providing a negative benefit for the other species (only include in grade 6).

Materials

- a set of cards containing 15 pairs with various aspects of nature that interact in some way found at the end of the lesson(ex: deer and tick or cow and grass) (only include exploitation in grade 6)
- each pair is in a different color to help students make sure they are right

Procedure

1. Prior to doing this activity, go over the definition sheet on the next page with students. Make sure they are somewhat familiar with each term.
2. Pass out all cards so that only pairs have been passed out (include yourself if there is an odd number of students).
3. Have students walk around trying to find their match based on whether or not they might interact (and whether or not they have the same color).
4. Once all pairs have been found, have students identify why they chose their partner and what type of specific interaction they might have.
5. Talk about advantages and disadvantages of the relationship and what would happen if one of the two were missing.
6. Take a hike and see if students can find examples of these types of relationships.

Definition Sheet for “Good Buddies”

Symbiosis:

When two species or organisms live in close physical contact with each other their relationship and at least one organism directly benefits from its close association with the other organism

Commensalism:

A relationship in which one species derives food or shelter from another species without seriously harming that organism or providing any benefits in return

Ex: sea anemone and clown fish or forms of mimicry (monarch and viceroy)

Mutualism

A reciprocal relationship in which two different species live in a symbiotic way where both species benefit and are dependent upon the relationship

Ex: any plant with berries and an animal that eats that plant and therefore disperses the seeds

Parasitism

A relationship between two species in which one species nourishes itself to the detriment of the other species

Ex: hookworms and lice

Exploitation

A relationship in which one species takes advantage of the other species providing a negative benefit for the other species (only include in grade 6)

Ex: any animal that eats another animal

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Appendix E: Public Relations

E.1 – Spring Valley Fall Festival Promotional Flier

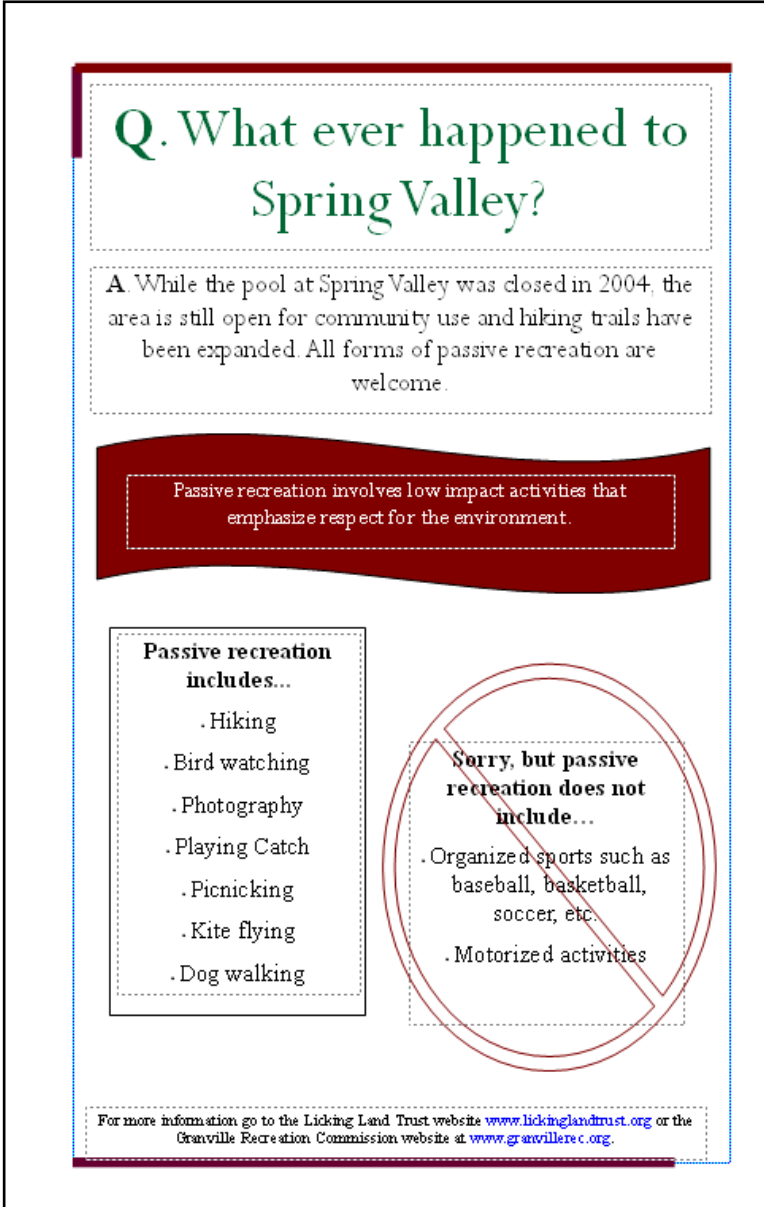
**Spring Valley Fall
Festival
November 8, 2008
2pm-4pm**

Join the Community Celebration

- Fall Refreshments
- Spring Valley history
- Nature Walks
- Live Music

A photograph of a rural setting. In the foreground, there is a gravel area with a wooden fence. A small, dark-colored building is visible on the right side. The background is filled with trees, some of which have yellow and orange leaves, suggesting an autumn setting. The sky is bright and clear.

E.2 – Spring Valley General Education Poster



The poster is enclosed in a black border. At the top, a red decorative bar contains the question. Below it, a white box with a dashed border contains the answer. A red wavy banner follows, containing a definition of passive recreation. Below this, two boxes are side-by-side: one with a list of activities and another with a list of excluded activities, the latter crossed out with a red 'X'. At the bottom, a white box with a dashed border contains contact information.

Q. What ever happened to Spring Valley?

A. While the pool at Spring Valley was closed in 2004, the area is still open for community use and hiking trails have been expanded. All forms of passive recreation are welcome.

Passive recreation involves low impact activities that emphasize respect for the environment.

Passive recreation includes...

- . Hiking
- . Bird watching
- . Photography
- . Playing Catch
- . Picnicking
- . Kite flying
- . Dog walking

Sorry, but passive recreation does not include...

- . Organized sports such as baseball, basketball, soccer, etc.
- . Motorized activities

For more information go to the Licking Land Trust website www.lickinglandtrust.org or the Granville Recreation Commission website at www.granvillerec.org.

E.3 – Spring Valley History Pamphlet (Page 1)

Spring Valley History



Denison University
Environmental Practicum
Fall 2008

In 1816, Chauncey Humphrey emigrated to Granville, Ohio. Shortly thereafter, Humphrey recognized the high salinity of Salt Run and dug a 200 foot salt well in Spring Valley. Each day, Humphrey took water drawn out of the well, placed it in troughs that were thirty feet in length, holding 1,240 gallons of salt water, and then transferred the water to thirty cauldrons for heating. However, Humphrey had an inefficient operation. Even with thirty cauldrons to boil down the salt water, he only produced two bushels (16 gallons) of salt per day.

Following Humphrey, Richard George owned Spring Valley property from 1848 to 1880. George also produced salt, which was sold in Lake Erie and Mt. Gilead. At the turn of the century, Willis Chamberlin purchased Spring Valley. During this time, Granville social events like 4th of July picnics, Bacon Bats (cookouts), and birthday parties were held at Spring Valley. Denison fraternities and social organizations also held events on the property.

Finally in 1929, Ed Roberts became the sole property owner of Spring Valley. Roberts built Spring Valley pool in 1933, charging 25 cents for adults and 15 cents for children to use the pool. Soon after, the Red Cross began swimming lessons at the pool and the scenic beauty of Spring Valley's

surroundings attracted Denison and Granville community members, who flocked to the space. Eventually, Spring Valley legends were born, such as the "proposal tree" which had a trunk forming a seat "just large enough for two."



Salt Mounds can still be seen at Spring Valley.

During World War II, a climbing tower was constructed at Spring Valley to give sailors from land-locked Ohio some water experience.

Passive Recreation

In 2004 the Spring Valley pool was closed to the public and the land was put up for sale. The owners agreed to sell the land to the Granville Township and Licking Land Trust at a reduced price, if they placed a conservation easement on the property. The purchase of the land was completed in 2006. Together, the Licking Land Trust and the

E.3 – Spring Valley History Pamphlet (Page 2)

Village of Granville worked to secure a conservation easement from the state, which would protect the land from development in perpetuity. The Licking Land Trust and the Granville Township worked with many local organizations to raise money for this effort.

Due to the protection of Spring Valley by the conservation easement, the Township and Land Trust must follow a very specific set of rules regarding land usage. Therefore, only "passive recreation" activities are permitted on the land at Spring Valley. Passive Recreation includes low-impact activities. For example, tossing a Frisbee is low impact, but playing an organized game of soccer is not. Spring Valley also has two miles of hiking trails and plenty of nature to immerse oneself in.

When asked to reflect on Spring Valley, Grace Gordon, former owner of Spring Valley and a member of the Roberts family, states

I am excited for the day when [...Spring Valley] returns to be a focal point for the community for celebrations, picnics, and festivals, as it has been for many years before. [...] My hope is that people of all generations will have

an opportunity to experience Spring Valley and connect [...] to the history of Granville and our natural world.

Geological and Ecological History

Spring Valley has two notable geographic features. The first is Flowerpot Hill, which is a large ridge of sandstone created by the Wisconsin Glaciations. At the time of Flowerpot hill's formation, the area was covered in ice. The second is Salt Run, a small stream with a total length of 3.5 miles. Salt Run cuts through sedimentary rock and glacial soil of Flowerpot Hill, exposing its interior.

Additionally, Granville Township rests in a valley at the tip of the Appalachian plateau, meaning that it is composed of Mississippian and Pennsylvanian bedrock. The steep valley of this area has prevented extensive development.

The Spring Valley nature preserve area is 45 acres. The forest surrounding Spring Valley consists mostly of beech and maple trees. This forest has been spared of extensive logging for over 200 years, which preserves the natural beauty

one can witness at Spring Valley today.

Osage trees and fence lines can be seen as evidence of past human development. At one time, Osage trees were used as field hedgerows. Remaining Osage trees in the Spring Valley forest tend to be over 150 years old.

Through passive recreation and an appreciation for the natural features of Spring Valley, The Granville community hopes Spring Valley will continue to play as important a role as it has in the past.

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E.4 – Draft of Website Update for Licking Land Trust

Description (Grantor and Approximate Location)	Acquired	Type of Protection	Area
The Roberts and Reeb Families Spring Valley Park Granville Township	2006	Easement	45 acres

E.5 – Draft of Website Update for Granville Recreation Commission

Located off Route 16 and adjacent to Salt Run, this historic 45 acre property was preserved by the Granville Township Trustees and the Licking Land Trust in 2006. Spring Valley is available to the public for passive recreation purposes, and two shelter houses that can be reserved for events through the Granville Recreation Commission.