

**Science 24/7**  
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Overview: The new building for Roosevelt Students will include an outdoor space for a habitat that will attract birds, mammals and insects. Our students will be afforded the opportunity to build this habitat from the very beginning because we are moving to a new school building. Not only will they research every aspect of this project using the internet, they will actually select native plants and design the habitat based upon their findings. This will be the beginning of an ongoing project that will bring together staff and students as well as community and other organizations to keep this as a permanent part of the school community. All of the activities are related. Students will be expected to keep this project in mind 24/7. They will own the garden because not only is it a part of the school grounds, it is part of the community and must be maintained during the summer as well as during the school year.

This is a unique opportunity because the students will be working on this project as the new building opens. We are entering a new building and children are in on the planning and selection of plants for the new habitat. They can plan every aspect of the habitat to attract animals and insects to the area. We can plan and research in the classroom and take what we have learned outdoors to put our ideas into practice. The students can take their ideas and findings and actually put those findings into practice.

Rationale: For the past several years the students of Roosevelt school have had an outdoor space known as an outdoor classroom. This space was very large and the center for outdoor studies of plants and animals. We have outgrown this building and now we are moving to a new building. Based upon a grant from the Audubon Society, the students will have the opportunity to design a new space on the grounds of the new school. This space will provide an outdoor habitat for local plant and animal life. The area will be maintained by the students and will become a permanent part of the new Roosevelt Elementary School. It will be cared for by staff, students and community members.

Objectives: Our students will follow the Pittsburgh School District Science standards and will incorporate units from the FOSS program. FOSS, Full Option Science System is the science

program adopted by the Pittsburgh Public Schools for the Pittsburgh Public Schools elementary science students. The students will work through the units and use the Full Option Science System (FOSS) modules to support the design and planting of the habitat. They will conduct experiments indoors and perform activities related to the FOSS modules. Then we can take what we have learned in the classroom and put those activities into practice outdoors on the school grounds. My students can develop a habitat that will attract wildlife and support native plant life. At the same time they will apply what they have learned to the habitat project. This gives the children the chance for hands on activities. It gives them an opportunity to have ownership for a project that will be ongoing on the school grounds.

Strategies: There are several organizations that are supporting this curriculum. My first contact is with the Audubon Society at Beechwood Farms. I have written a grant to support an outdoor habitat at the new Roosevelt Elementary School. That grant is a two year commitment that will allow us to design and plant an outdoor habitat to be maintained by my students and the community. There are a team of teachers, volunteers and administrators attending classes at Beechwood Farms who will work together to implement this project on the new school grounds.

I will also be working with Project Earth Force. This is a student driven program where students will spend time working on a community project. Our habitat will be the one that will be an ongoing part of our community work. I will receive one week of training at the Pa. Resources Council on the South Side of Pittsburgh. Students will meet in the Spring of 2002 with other students participating in this program to share results and report on their project.

I would like to establish a partnership with Carrick High School. Students there will act as mentors for our children and work with them to maintain the outdoor habitat.

During their senior year, Carrick students must complete a Senior project. One of the Carrick students, Michael Henchir, chose to work with Roosevelt students on the habitat project. This will be the focus of his senior project. He will work closely with me and with our team to establish a partnership with Carrick High School. This partnership will continue from year to year and will be a source of help and guidance to my students. Michael will also participate in the summer classes that will prepare us to work with the students in the habitat.

Classroom Activities:

Activity 1

Students will photograph the area in the fall. They will sample the soil and check for sunrise and sunset patterns. The students will journal all of their activities on computers and will write articles for the Roosevelt Eagle Newspaper. This will promote the project and inform the school and the local community about what is going to be placed in the habitat area.

The students will use the digital camera and will make a photo album to be used on our web page. The album will also be used to document the work that we do.

The Full Option Science System (FOSS) Earth Materials Unit will help us to sample soil and identify rocks and minerals in the habitat area.

Give complete instruction on use of the digital camera.

Give a disk to each of the students so that they can use it to save their journals.

## Activity 2

The Science classes will record observations of what has been done during the summer months to initiate the project. I will train the students to use the digital camera and we will incorporate those photos into our Roosevelt Web Page.

The students will identify observation areas inside the school as well as outdoors. They will use these areas to keep track of animals in the habitat. They will observe light patterns and wind patterns as well as other environmental factors that will be important for the selection of native plants. The observation areas will be marked with signs made by the students. These observations will continue during the school year. Students will record their observations in their journals using the computers in the Library or the Science Room. This activity will take place from the outdoors during September and October and even into November if the weather permits. During inclement weather the children can make their observations from indoor observation points.

The library will be a key observation area. It is in the back of the building and two of the walls with a good amount of windows face the habitat area. Students will work with the librarian to negotiate times and rules of observation from the library observation points during certain times of the day.

Students will also use binoculars for observation. They will practice using the binoculars in the correct way and then older students can train the younger ones in the observation methods.

The diskettes used for observation will be kept in the Science room. We will use these notes to make changes in the habitat area. Students will review their notes as we have frequent discussions about planning for plants to be used and animals and insects that are observed in the area. Students will use these journals to report to organizations that give support for this project. The notes also support the writing standards of the Pittsburgh Public Schools. It is important for the children to know that Scientists must communicate observations and findings in a clear and understandable way.

## Activity 3

The students will map the area using overlay maps. Overlay maps are made by using transparency film. Each transparency will picture one feature of the habitat. Shape of the area, traffic patterns, planting areas and any other of the features will be added to each of the transparencies. The students can lay one on top of the other and use different color markers to have an idea of what the habitat will look like. Using photography and drawings the children will journal and compare notes in the classroom.

Final mapping will be decided upon by the fourth grade students and the staff team. This can be worked on in the Science room during the late fall season. The children will go to the observation stations in the building to look at the habitat when designing their overlay maps.

Transparencies can be easily added when students come up with new ideas.

Summarize: Students will look for physical features. Determine how space is utilized and what people like or don't like about the space. The overlay map will include a base map, a people map to track students teachers and community, a vegetative cover map, a soils map and a physical features map.

1. Base Map-Establish a scale, get a readymade map or photograph of the school site.

Include all areas and water sources.

2. People Map-Take into account the needs of Students teachers and community.

3. Vegetative cover map-Describe types, structure and arrangement of vegetation.

4. Soil Map- Find the soil pH and Soil Texture and moisture.

5. Physical Features Map- Map sunlight, moisture,landscape, wind temperature, sound, and eroded areas.

6. Seasonal structures map-Map use of site for special events.

#### Activity 4

Full Option Science System (FOSS) measurement. Students will map and measure the area using metric units. They will chart and record daily temperatures and observe any animals present in the habitat area. I will notify the math teachers that students will be measuring using centimeter units. The measurements will be entered in our journal kept on the computers.

Temperature: Students will be monitoring the temperature daily during the school year. They will record the temperature in Degrees Centigrade. They will keep the information in their journals and we will graph the temperature daily. Observation of the sunlight will be necessary to setting up the habitat. Students can keep daily records of sunlight and position of sunlight at specific times of the day.

Animals: I will ask the students to notice what animals and insects they can observe in this area. They will record their findings in their journals. This observation will also be ongoing. The class will discuss what we want the habitat to offer to local wildlife. These discussions will take place in the classroom as well as on the habitat site.

### Activity 5

The students are going to learn to sample the soil ph. We will take a variety of samples and practice in the classroom. We will learn to use the materials and method that we received in the Audubon soil sampling kit. The children will also measure the moisture content of the soil.

The Full Option Science System (FOSS) Earth Materials unit, Grade 3, direct

Students in how to analyze and identify various rocks and minerals. This correlates with the soil sampling to be done outdoors. The students will work on the lab material in the Science Room. They will use the internet to research rocks and minerals and to identify native plants that will do well in our soil. The children will make a rock journal which will record the tests on a variety of rock and mineral samples and will record the results.

### Activity 6

Students will use the computer lab to research and record information about native plants. Journal findings and select perennials that we will plant in the Spring of 2003. This activity will begin in The early Fall season and will be ongoing. We will keep a record of all that we do and maintain a Web page for the Science room that directly relates to the habitat. Each student will have their own disk that will be kept in the Science Room. They can use these disks to record all of the work and readings that are taken throughout the school year. Students will learn to make power point presentations for parents and other groups interested in the project.

The web page will be updated with the help of the Carrick High School student working on his Senior project. These records and presentations will be made from time to time to our funding organization The Audubon Society of Western Pennsylvania.

The children will work in the computer lab to learn Power Point presentations. We can use the Smart Board to design the presentation as a group. The children will be given the

opportunity to practice this skill on their lab computers. And, they will be encouraged to practice at home if the Power Point program is available to them.

### Activity 7

During the winter season, students will construct nesting boxes and bird feeders that will be used in the habitat. The Students will identify ecological niche and give at least one example of a bird and its ecological niche. They will define the role of the animals in the community. They will demonstrate observational and data collection skills by collecting information about food habitat and water requirements of birds. The children can identify exactly what birds need to survive in the school habitat. They can use the four requirements for life, food, water, shelter and space to place the feeders and nesting boxes in the correct area and make certain that birds can survive in this environment. Nesting boxes can be designed in the Science room and built in the Art room. The art teacher will also teach primary science using her dual certification.

We have a limited space in the habitat, so the children will have to determine where to place the nesting boxes and feeders. Nesting boxes will have to be able to be seen from the observation areas in the school as well as accessible outdoor observation stations.

We will study the process of photosynthesis. The students will learn about how plants make food. Using the FOSS Variables module students will research a variety of factors that can cause an interruption of the photosynthesis process.

The children will look at all of the variables involved with the planting of native plants.

It will be important for the children to understand what will be necessary in the school grounds environment for our plants to survive.

### Activity 8

The students will incorporate signage into the habitat. They will make a decision about which will be the most important signs for the promotion and success of the project.

The Art teacher in the new building will also teach primary science. As we decide what the signs will define, the students can return to the art room and design the signs for the habitat. They are going to identify the wildlife in the area and we will identify each of the plants in the habitat. Then, we can identify various nesting boxes and what birds will be attracted to those boxes. Based on the mapping done by the students, children can identify areas of the habitat and how those areas will be used. Directional signs will also be helpful indicating North, South, East and West. We can plan for light patterns and wind direction from these signs.

Signs will also be placed inside the building. They will label observation stations and directions to the outdoor habitat as well as to the Science room where most of the indoor work will take place.

### Activity 9

Students will practice their observation skills of the habitat area from inside as well as outdoors. When snow is on the ground, a unit on what is under the snow will be part of our investigations. Students will record observations of what plants and animal signs they can find underneath the snow. Special attention must be paid to the students clothing for outdoor work during the winter. Plan ahead, review weather reports and discuss what clothing would be appropriate for this outdoor activity. Use of the FOSS weather module, grade 2, can help plan weather reports for the students who will be doing the outside activities in the snow. We will also use the internet to look for weather forecasting to support our FOSS weather unit.

The children can record their observations in their journals. Students will have their own diskette on which to record their thoughts. They may respond to such questions as :

The most amazing , interesting or surprising discovery was...

Something that I figured out was....

Some things I did that are like what a scientist does are

Is the site a good place for animals to live in the winter? Why? Why not?

### Activity 10

Students will update our web page as we continue along with the project. We will continue our observations during the change of seasons.

Using a Smart Board, the children can work as a group in the Science room to update the web page that refers specifically to the outdoor habitat. The Smart Board allows us to work as a large group on any project that is being done on one computer. Refining this page will occur after school with the help of the Carrick High School student who is working with our children on development of the habitat.

The children will refer to their journals to add any materials that are important in the ongoing development of this project. We can also add photos that the students have taken with the digital camera. The students will select the photos to be used. All activities will be student

driven but teacher directed. Students will make choices about the habitat and our team of teachers will have final approval of what the students decide to do.

#### Appendix-Content Standards:

##### Science & Technology Standards:

1. All students explain how scientific principles of chemical, physical and biological phenomena have developed and relate them to real-world situations.
2. All students demonstrate knowledge of basic concepts and principles of physical, chemical, and biological and earth sciences.
3. All students use and master materials, tools and processes of major technologies which are applied in economic and civic life.
4. All students explain the relationships among science, technology and society.
5. All students construct and evaluate scientific and technological systems using models to explain or predict results.
6. All students develop and apply skills of observation, data collection, analysis, pattern recognition, prediction and scientific reasoning in designing and conducting experiments and solving technological problems.
7. All students evaluate advantages, disadvantages and ethical implications associated with the impact of science and technology on current and future life.
8. All students evaluate the impact on current and future life of the development and use of varied energy forms, natural and synthetic materials, and production and processing of food and other agricultural products.
9. All students demonstrate basic computer literacy, including word processing, software applications, and the ability to access the global information infrastructure, using current technology.

#### Appendix: Content Standards

## Environment and Ecology Standards

1. All students understand and describe the components of ecological systems and their functions.
3. All students think critically and generate potential solutions to environmental issues.
4. All students evaluate the implications of finite natural resources and the need for conservation, sustainable agricultural development and stewardship of the environment.
5. All students demonstrate an understanding of the local, national and international implications of environmental and ecological issues.

## Reading, Writing, Speaking and Listening Standards:

1. All students use effective research and information management skills, including locating primary and secondary sources of information with traditional and emerging library technologies.
3. All students respond orally and in writing to information and ideas gained by reading narrative and informational texts and use the information and ideas to make decisions and solve problems.
4. All students write for a variety of purposes, including to narrate inform and persuade, in all subject areas.
6. All students exchange information orally, including understanding and giving spoken Instructions, asking and answering questions appropriately, and promoting effective group communications.
7. All students compose and make oral presentations for each academic area of study that are designed to persuade, inform or describe.

## Bibliography for Teachers

Beginner's Guide to Attracting Birds to your backyard, Publications International Ltd.,1991

Birds & Blooms Magazine, Beauty In Your Own Backyard, Subscription 2001-2003

Full Option Science system, FOSS, revised 2000. This is the curriculum adopted by the Pittsburgh Public Schools. Developed at the Lawrence Hall of Science, University of California at Berkeley, Published and Distributed by Delta Education, Inc.2000.

FOSS Modules:

Grade 1 Modules, Trees, New Plants

Grade 2 Modules, Air & Weather, Insects

Grade 3 Modules, Measurement, Earth Materials

Grade 4 Modules Ideas & Inventions, Water

Grade 5 Module, Variables

Grant, Tim and Littlejohn, Gail, Greening School Grounds, Creating Habitats for Learning, New Society Publishers, 2001, The book reflects the expertise of more than 40 authors and 75 Reviewers, many of them North American pioneers in schoolyard greening.

Hamill Natalia K., 100 Easy Perennials, Publications International Ltd. 2000.  
This book explores endless possibilities with perennial gardening.

Indoor Gardening, Penn State, college of Agricultural Sciences cooperative Extension, 4H Plant Science, Unit 2 This project teaches basic plant care –how to house-train plants.

Kiefer, Joseph & Kemple, Martin, Digging Deeper, Integrating Youth Gardens Into Schools & Communities, A Comprehensive Guide, 1998, A product of Food Works and the Common Roots Press. This book is the culmination of 10 years of Food Works' experiences in schools and communities showing how gardens can be used to grow food, grow children, and grow curriculum.

Lingelbach, Jenepher, Hands-On Nature, Information and Activities for Exploring the Environment with Children, Vermont Institute of Natural Science, 1986. This book enables novice leaders to teach nature subjects successfully and to offer creative new approaches to experienced environmental educators.

Pennsylvania Wild Resource Conservation Fund & Pennsylvania Game Commission, Woodcrafting for Wildlife, New or Revised Text and Plans by Jerry Hassinger, Wildlife Diversity Supervisor PA Game Commission. This book gives an explanation of the types of habitats that various wildlife need. It also gives plans to construct the habitats for wildlife.

Peterson, Guides, Birds First, A simplified field guide to the common birds of North America Project Learning Tree, Environmental Education Activity Guide, Pre K-8, 1998, This guide is arranged under five major themes: Diversity, interrelationships, systems, structure and scale, and patterns of change. The activities integrate the themes within science, language arts, social studies, art, music and physical education.

Rollins, Timothy J., & Wolnick, Dennis J., Indoor Gardening, 4H Plant Science, This project teaches basic plant care- how to house-train plants.

Russel, Helen Ross, Ten-Minute Field Trips, Second Edition, A Teacher's Guide To Using The School Grounds For Environmental Studies, 1996, J.G. Ferguson Publishing Company, Original Printing, 1993. This book gives a wealth of information for working in the best classroom of all, the outdoors.

Schoolground Habitat Enhancement and Restoration Project Manual, This is a series of articles, activities and information provided by the Audubon Society, Beechwood Farms.

This collection of articles was given to the members of the team participating in the training for the Habitat Enhancement Project at Beechwood Farms. The activities can be used by teachers and students who are working in the habitat project.

Schmidt, Victor E. and Rockcastle Verne N.- Teaching Science With Everyday Things, McGraw-Hill Book Company, 1968. Shows how to use everyday items when teaching science to children.

Schneck, Marcus, Landscaping for Wildlife in Pennsylvania, Published by the Wild Resources Conservation Fund, Harrisburg, Pa., This book provides a down-to-earth look at backyard wildlife habitat.

<http://www.newscientist.com> This site leads to a variety of places that will support the habitat project.

<http://www.kinderGARDEN.com> An introduction to the many ways children can interact studying horticulture. Horticulture, the information swerver of the Department of Horticultural Sciences, Texas A&M University, College Station Texas, 77843. Revised in 1998 by Sarah Lineberger

<http://www.paconserve.org> Western Pennsylvania Conservancy Garden Calendar, School Garden Initiative, A project of the Grable Foundation

[http:// www.Fossweb.com](http://www.Fossweb.com) Contains sixteen modules with interactive online activities.

Earth materials, Water, Mixtures and Solutions, Measurement ,Variables, Environments are the interactive activities that support construction of the habitat.

[http:// www.evergreen.ca](http://www.evergreen.ca) All Hands in the Dirt, Guide to designing and creating Natural School Grounds

<http://aswp.org/nativePlants.html> ASWP's Audubon Center for Native Plants

<http://www.carnegielibrary.org/subject/gardening/nativeplants.html> Native plants & Wildflowers, Carnegie Library of Pittsburgh

[http:// www.delawarewildflowers.org/links.html](http://www.delawarewildflowers.org/links.html) Wildflowers of Western Pennsylvania

<http://www.pawildflower.org/links> Plant Society, Wildflower information for Pennsylvania.

<http://www.nearartica.com/organize/consERVE/natplant.htm> Botanical Society of Western Pennsylvania