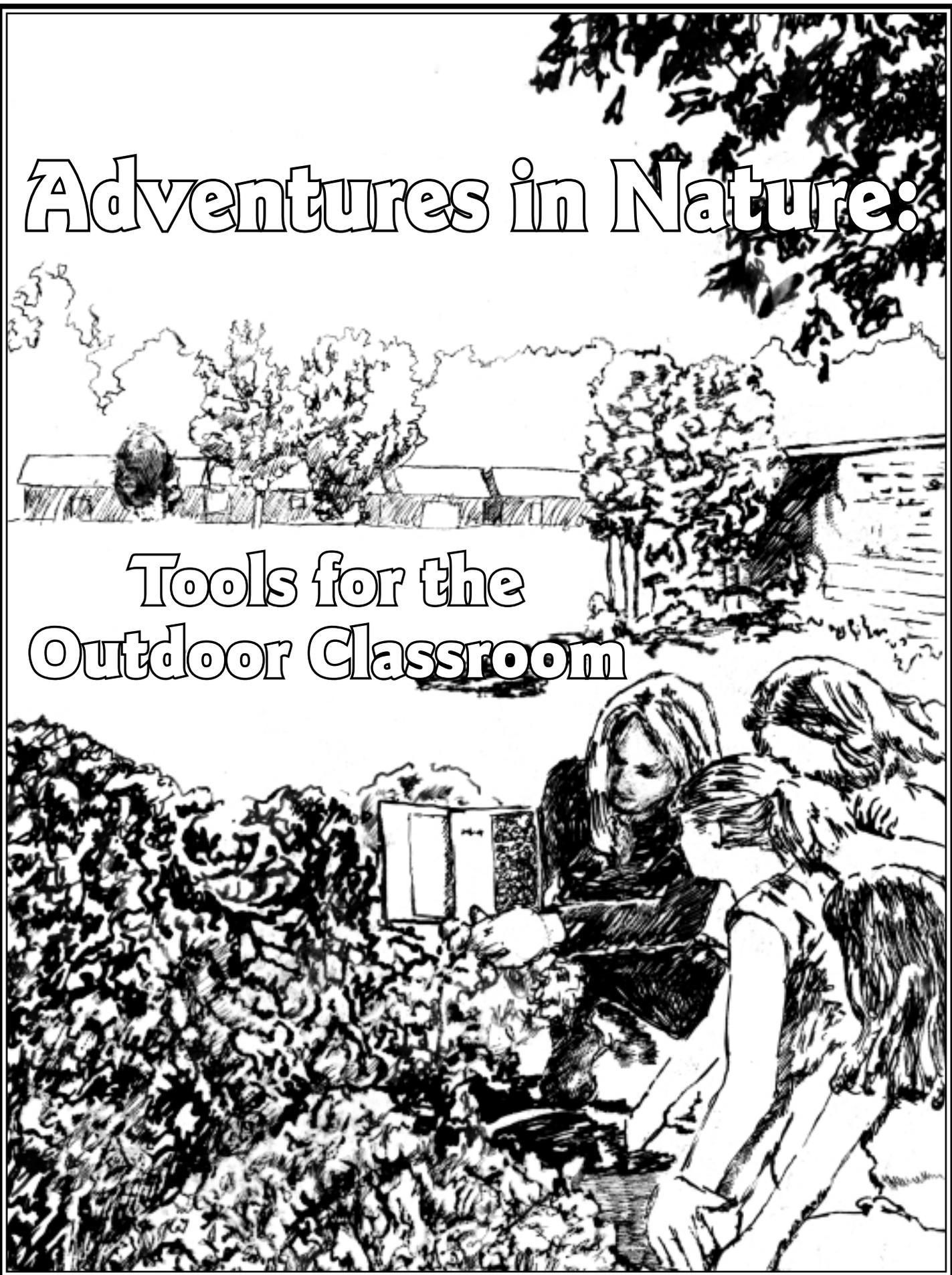


Adventures in Nature:

Tools for the Outdoor Classroom



**Adventures in Nature:
Tools for the Outdoor Classroom**
prepared by the Arkansas Forestry Commission
Urban Forestry Division with assistance
from the University Of Arkansas
Department of Vocational Education
July 2001

The preparation of this book was financed with a grant from the
USDA Forest Service Southern Region through the
Natural Resource Conservation Education Program.

Table of Contents

Introduction	2
Setting up Your Committee	3
Subcommittees	4
Funding Your Outdoor Classroom	5
Resources for Money	6
Seeing What You Have	7
Developing a Written Plan	8
Creating Your Workforce	9
Designing the Outdoor Classroom	10
Learning Stations for the Outdoor Classroom	11
Key Features for Arkansas' Outdoor Classrooms	14
<i>Cycle of Life</i>	15
<i>Erosion Control</i>	17
<i>Wildflower/Butterfly Garden</i>	18
<i>Bird Sanctuary</i>	19
<i>Water Features</i>	22
<i>Animal Tracking Station</i>	24
<i>Amphitheaters</i>	25
<i>Tree Identification Trail</i>	26
<i>Wildlife Habitat</i>	28
<i>Compost Pile/Recycling Station</i>	30
Twenty Questions To Ask When Buying a Tree	32
Tips for Proper Tree Planting	33
Maintenance	34
Example Activities	36
Outdoor Classroom Design Examples	41
Where to Get Additional Information	49
References	50

Introduction

When thinking about adding an outdoor classroom to your school, look at it as a tool that integrates many subject areas for students to explore and discover about the environment. An outdoor classroom provides the teacher with so many options where the normal textbook ends. It does not just benefit one class or subject, but all of them. History, English, science, geography, art, etc. -- all have places in the outdoor classroom.

When the weather is nice and the birds are singing, it is hard to draw the attention of the children away from the window. Kids can be excited by the smallest things. For instance, a silk worm climbing on a leaf, or a butterfly perched on a flower can be very intriguing. You capture the child's natural draw to these events with an outdoor classroom. Besides wouldn't you rather be outside too?

Now that you are ready to get your outdoor classroom started take a close look at what must happen for the project to be successful.

The first detail is to **get organized**. The most successful way to get off and running is to create a standing committee of the right people. Involve a teacher from each grade level, the principal, the grounds keeper, a local natural resources expert, and if not on the committee, at least talk to the adjacent landowners of the property. Once this committee is organized develop subcommittees to address funding, public relations, curriculum, site development, and maintenance.

Next, come up with **ideas and proposals for curriculum**. Just like anything else all aspects of the project need to be planned before any action is taken. A person does not build a school without a plan as to how the inside will work. Why build a classroom without an idea as to how it is going to relate to different classes? In the outdoor classroom all subject areas benefit. Consult with teachers to find out how they would like to use it for their classes. There are some great supplements available that can help teachers integrate the outdoors into the classroom. Another idea is to have an in-service for teachers in conservation education. This training will present lots of great ideas and get all the teachers on the same page.

One of the biggest issues when schools are trying to add to their already under-funded projects is **money**. Some outdoor labs cost thousands of dollars but other labs, just as effective, cost just a few hundred dollars. Cost should not get in the way of the children's need to learn with local support and motivated people behind the project. The outdoor classroom can be set up into phases and developed as funding becomes available for each area. There are endless ideas for fundraisers. Do not let funding get in the way of having the classroom. Make sure there is a plan to fund the project before breaking ground. If need be develop a basic outdoor lab which will meet the present needs of the students. The option to add on later is always there. Envision the outdoor classroom as always growing.

Once the classroom is done it will have to be maintained, therefore, **maintenance** needs to be part of the planning process. No one wants their hard work to go to waste, so devise a plan to work with the maintenance crew at your school to keep the outdoor classroom looking its best. Remember that the students can do some of the work and it can be a part of the learning process.

Now it is time to start finding the people to make up the committee. Talk about the project at the school and get people excited. Have a place in mind to use for the outdoor classroom. The most important thing to remember is not to get discouraged. It won't happen overnight, but if the classroom is well planned it will succeed.

Setting Up Your Committee

Organizing the committee is the most important start to any project. Building an outdoor classroom is no exception to the rule.

The object of a committee is to bring together human resources to collaborate on the ideas and duties of the project. Look at potential members' areas of expertise as well as their jobs in the school. Enroll people that have time to devote to the project and will make it an important part of their daily duties. It is also important to bring together a group of people that can use their talents for various aspects of the project.

We all lead very busy lives and fitting a committee meeting into our schedule can be nearly impossible sometimes. It's a good idea to have a large committee so the project can still move forward in case attendance is low at meetings.

People to have on the committee

- A teacher from each grade level
- The school principal
- Groundskeepers
- Students
- Local natural resources professionals
- Adjacent landowners
- Agriculture teachers from your area high school
- 4-H Leader/ members
- PTA/PTO members
- Master Gardeners
- Parents
- Grandparents
- Science Club Representative
- Girl Scouts/Brownies
- Boy Scouts/Cub Scouts



Subcommittees

The five basic subcommittees to have are Funding, Public Relations, Curriculum, Site Development, and Maintenance. Additional committees may be required but these are necessary.

Funding is self-explanatory. This committee will be responsible for creating a budget and gathering funds to meet that budget. The group will work a lot with the public relations committee. If you have a shortage of people it may be useful to combine both public relations and funding into one committee. Ideas can be found in the “Funding Your Outdoor Classroom” section of this publication.

The **Public Relations** committee is responsible for creating public awareness for the project. It is good to first get your school and school system excited. This will create a basis for word of mouth communication. Think about using newspapers, TV, posters, presentations to local organizations, and even creating a booth at the county fair to inform people about the project. Presenting the project to the public is a good way to promote the program. The site development committee could make a model to show them what it is actually going to look like.

Curriculum is going to be one of the most fun and easy committees. It helps to have the most creative and excited people for this committee. Create a group of plant and nature experts to help with the factual end of the curriculum. This committee will be responsible for gathering educational materials for the outdoor classroom. They will also be responsible for planning with the administration on faculty training in conservation education. The key is to create applications for all subjects.

Site Development and Maintenance is the beginning and never ending aspects of the project. Gathering information on the school grounds will prove a useful beginning. Anything of historical significance, perhaps water features, or maybe a really old tree can all be worked into the layout. Long-term maintenance will have to be considered in designing the layout. Create a calendar with tasks assigned to appropriate times of the seasons (see Maintenance Calendar). If possible have the groundskeeper as the head of this committee since they will be responsible for the maintenance when adding an outdoor classroom. Make good friends with the groundskeeper.

Different needs and situations will define how these committees work but the basics should be the same. Communication between these groups and the standing committee are very important. Creating a list of the committees, members, and their method of contact, via e-mail, phone numbers, etc., is a good idea. Hand it out to all the members. A calling tree will help get everyone together. Create lists of committee members with the chairperson responsible for calling two members and then they call two other members until everyone has been called.

Funding Your Outdoor Classroom

Since we still haven't perfected the money tree there is always a need for money in any project. It is important to start raising funds as soon as possible for the outdoor classroom.

Prepare a list of features that are wanted in the outdoor classroom. When a complete list is compiled a budget can be formed and then a fund raising goal set. To decide on what is needed the process should be a combined effort between committees.

The best way to get started is to ask someone who has given to the school in the past. Approach a business or perhaps write a grant. Get a little nest egg. This will show people that the school is serious about the project; it is a positive note to get started on. Remember to tell any prospective contributor what the money is going to be used for, how much it costs, and how it will benefit the students.

Some Ideas for Sources of Funds

- School PTA/PTO
- School Budget
- School Board
- Service clubs and organizations
- Conservation clubs
- Businesses
- Corporations
- Foundations
- County Farm Bureau
- State Agencies
- Grants



Remember to recognize people or businesses that donate in the newspaper or with a sign at the schoolyard. It is always good to give them recognition and it makes them more likely to give in the future.

Fund Raisers

- | | |
|-----------------------|------------------------------------|
| – Collect recyclables | – Otis Spunkmier cookies |
| – Raffles | – Valentine Delivery service |
| – Fish fries | – Christmas cards/ paper sales |
| – Bake sales | – Pie Auction |
| – Candy sales | – Ice Cream Treats (sale at lunch) |
| – Tree sales | – Fruit Sales |
| – Chili suppers | – Gift Baskets (Christmas) |
| – Watermelon feeds | – Halloween Carnival |
| – Penny wars | – Sock Hop |

Resources For Money!

National Wildlife Federation
Schoolyard Habitats Program
8925 Leesburg, VA 22184-0001
www.nwf.org/habitats/schoolyard

Wild Ones Natural Landscapers
P.O. Box 1274
Appleton, WI 54912-1274
www.for-wild.org/seedmoney.htm

The Captain Planet Foundation
One CNN Center
Atlanta, GA, 30303
www.turner.com/cpf

The Center for Environmental Education
"Make Your World Better" Grant Program
Antioch New England Graduate School
40 Avon St.
Keene, NH 03431
(603) 357-3122
www.cee-ane.org

Environmental Protection Agency (EPA)
Headquarters Office of Environmental Education
1200 Pennsylvania Ave. NW, 1704
Washington D.C. 20460
(202) 260-4965
www.epa.gov/enviroed/grants.html

The Jordan's Fundamentals Grants Program
National Foundation for the Improvement of
Education
1201 16th St., NW
Washington, D.C. 20036
www.nfie.org

National Environmental Education and Training
Foundation
1707 H St., NW, Suite 900
Washington D.C. 20009
(202) 833-2933
www.neetf.org

National Gardening Association
Youth Garden Grants
1100 Dorset St.
South Burlington, VT 05403
1-800-538-7476 x205
www.kidsgardening.com

Sea World/Busch Gardens Environmental
Education Awards
Education Department
7007 Sea World Drive
Orlando, FL 32832
1-877-792-4332
www.seaworld.org/EEAwards/eea01.htm

Toyota TAPESTRY Grants for Teachers
c/o National Science Teachers Association
1840 Wilson Boulevard
Arlington, VA 22201
www.nsta.org/programs/toyota.htm

Growing Together Program
National Tree Trust
1120 G St. NW, Suite 770
Washington, DC 20005
www.nationaltreetrust.org

Entergy Environmental Grant (only in service
area)
Entergy Customer Relations- Cheryl Evans
P.O. Box 551
Little Rock, AR 72203
(800) 772-5767
www.entergy.com

Wal-Mart Environmental Grant
Contact the Green Coordinator
in your area.
www.walmartfoundation.org

Projects Wet & Wild grants
Arkansas Game & Fish Commission
#2 Natural Resources Drive
Little Rock, AR 72205
www.agfc.state.ar.us

Seeing What You Have

When planning an outdoor classroom determine what resources for the project are already on the school grounds. One of the best ways to gather this information is to take an inventory.

Start with a basic map showing the lay out of the school and the boundaries of the schoolyard. Then have several people draw and list features that they find on the site. One person might see something someone else has missed by having different people take inventory. Have the students inventory as an activity. It is surprising at what they pick out that adults sometimes miss. The Natural Resource Conservation Service can also assist with mapping the school grounds.

What to include in the inventory

- Animal habitats (dens, nesting sites, brush piles, food plants, old stumps, dead trees, and fallen logs)
- Areas not regularly mowed (fence rows) that can be used as natural areas or plant successions.
- Developed areas (buildings, parking lots, playgrounds)
- Historic remnants (stone fences and old orchards)
- Sites that are appropriate for nature trails or study areas (ponds and marshes)
- Soil profiles exposed on banks and slopes and potential soil erosion and soil study areas
- Topography and geological features (rock outcrops, boulders, slopes, streams, ponds, bogs, and swamps)
- Vegetation (grasses, shrubs, trees, weeds, wildflowers, harmful plants, plants used by native Americans or early settlers and possible plant succession sites).

Once all the existing features are listed evaluate each feature to see which are going to be most beneficial to use in the outdoor classroom. Other details to keep in mind while you are doing this are:

- _ Distance from school building
- _ Access from building to grounds
- _ Security of the site
- _ How the features will be incorporated (easily or with difficulty)

Take before photos of your school ground. Use these while evaluating the features and documenting the progress. Taking photos throughout the whole process is a rewarding and fun idea.

Developing a Written Plan

It is always a good idea with any project to develop a written plan. A good written plan keeps the goals organized through the years and helps to relay ideas to others.

The plan should clearly define and explain educational objectives and benefits. Remember that the outdoor classroom is a tool to be used for all subjects, not just science.

The plan should include

- the goal behind the outdoor classroom, and objectives for all subjects,
- an area selected for the outdoor classroom on the school grounds,
- committee and classroom responsibilities,
- suggestions for appropriate treatment of problem areas and conservation practices, with detailed specifications,
- how it will benefit the community,
- ideas for study stations, nature trails, greenhouses, gardens, and study guides,
- plans for additional plantings to benefit wildlife, stabilize soil, enhance beauty, and
- establish study gardens and an arboretum,
- realistic timetable for completing specific projects, and
- budget for materials, installation and maintenance.

The outdoor classroom should be appealing to all people of the community. With every feature you add keep in mind safety issues for the many students and local residents who will be using the area.

When developing a written plan, try to keep it flexible for expansion. Like the plant life outside the school, your outdoor classroom should never stop growing. A successful program will have more involvement from the school and community through the years.

A list of features has been developed to show just some of the possibilities for an outdoor classroom. Keep in mind some features are feasible for some schools but not for others. Think realistically when picking out projects for the first year. Do not try to take on too much.



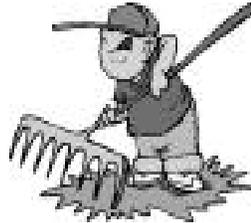
Creating Your Workforce

Volunteers are going to be a big key in getting a project off the ground and assure its success. There are many methods and places to recruit volunteers. Always be on the look out for anyone with a special skill that might be able to help.

The best thing to do is get people excited about the project. If they are excited about the outdoor classroom they will want to be a part of it. Try to do different projects at school with the kids to get them excited about conservation. Parents are always asking what the kids do at school so send home a newsletter about the outdoor classroom and ask for suggestions and help.

Other places to consider getting help.

- PTA/PTO
- Girl Scouts of America
- Boy Scouts of America
- 4-H Club
- National Honors Society- at your area high school
- Almost any club in your school system
- Service organizations in the community
- Parents
- Grandparents
- Teachers
- Teachers' spouses
- Students - all grades
- Master Gardeners
- Urban Foresters and horticulturist
- Landscape Architect
- Area Contractors
- American Legion
- Area Museum
- Police/ Fire departments
- Area park service
- School Groundskeeper
- City hall



Organizing volunteers is crucial to achieving the best results for workdays on projects. When starting a particular project have people with expertise in that area to be there to lead the group. It would be devastating to the project if you had a large group of people show up but no one with the knowledge to guide them. It wouldn't just hurt that day of work, but future days too. People that have donated a day and spend it sitting around because of disorganization will be reluctant to return.

When someone has volunteered time to help, recognize him or her in some way. One idea is to dedicate a tree to people who were dedicated to the project. A walk with embossed handprints and names of people that helped is another way. Always write thank-you notes to let them know how much their work is appreciated. Send it to them at their work address if it is available. This communication will create awareness as well as recognize them for their effort.

Designing the Outdoor Classroom With Trees

When preparing an outdoor classroom master plan first do a site analysis. To start, determine which way is north and mark it with an arrow. Knowing the directions will assist in resolving where to place the learning stations such as vegetable and flower gardens and amphitheaters. It will help in selecting plants that require sun or shade and also provide guidance in deciding where details such as shading and wind buffers might go.

Place the existing features on the site analysis plan: trees, shrubs, wildflowers, thickets, streams, wetlands, rock outcroppings and utilities. Utilities are very important. Do not plant trees beneath them or build permanent structures over them.

Do a tree inventory for existing trees on the site to determine what species there are and their condition. Knowing the species will provide their attributes such as whether they are deciduous or evergreen, what will be their mature size, what kind of habitat they will provide for wildlife and so forth.

The condition of the tree determines how healthy it is and if it requires maintenance or perhaps removal. The trees should be checked for proper branching structure, dead branches, decay, fungus and other pest that contribute to tree health. If there is a tree that at some point will need to be removed, consider planting another tree beside it to take its place later on. When the health of a tree is questionable, call the forestry office, an arborist or someone who specializes in trees. Go ahead and have any tree work done prior to installing new features on the site so there will be less chance of damage to structures and plants.

Do not have the trees topped. When trees are topped it makes large openings that cannot seal over and decay will set in, suckering will occur, and a hazardous condition will be created. Eventually the tree will die.

Other characteristics to look at on the site to help in laying out the plan are erosion problems, noise, dust, bright lights, etc.

Make a list of additional features you would like to have in the outdoor classroom.

- What about a tree identification/walking trail? Trails should try to incorporate as much of the site as possible to maximize the number of trees available and keep the walking experience enjoyable.
- Is a butterfly garden on the request list? Butterfly gardens should be strategically located to get as much full sun as possible and have some type of buffer from north winds.
- Is attracting wildlife important? Trees, shrubs, rock-piles, brush-piles and water features all help to attract wildlife.
- Is low maintenance a priority? Mulches, groundcovers and shade all help to reduce the need for mowing and weeding.

Once all the criteria has been determined for the outdoor classroom it is time to develop a master plan. Decide on a scale for the plan. Using a scale of 1"= 10' or 20' will make it much easier to figure out how much space is available for a particular station or how many plants are needed in a certain area. Once all the existing features are on the plan it is ready for mapping the trees. Draw them at their mature canopy size so you can see how much area they will need or cover. Not only for above ground but below ground too. It is important to know where the root system is if the school is going to be changing the grade by building raised walkways, building a gazebo or digging in the ground to construct a water system. Tree roots normally grow in the top 12-18" of soil. A rule of thumb is to see where the drip-line is, although tree roots can grow twice as far as the tree is tall. When adding soil and impervious materials around a tree it reduces the uptake of water and gaseous exchanges. This can eventually kill a tree.

Draw in the larger components first such as trails, greenhouse, gardens, recycling center, bird sanctuary, etc. Then fill in with the additional features on the plan.

When constructing the classroom build it in the same manner by incorporating those items that will have the largest impact on the site first. This will reduce the chance of damaging planted material and smaller learning stations.

Learning Stations for the Outdoor Classroom

Air Pollution Station- There are several commercial units that can be bought for relatively little money to use for this station. This is a good place to present lessons on the harmful effects of many everyday events we don't normally think about as being harmful to our air.

Animal Track Area- One of the easiest and least expensive things to do in the outdoor classroom is to create an animal tracking area. Designate an area that is at least 3' square and has an impressionable surface. Soft clay or sand is most commonly used in this area. Do not forget to look for tracks in the snow! If there is a water feature on the school grounds it is best to locate this around the edge of it. Use food to attract animals if water is not available. Check the area regularly for fresh tracks. Teachers and students alike will be surprised at what they find.



Arboretum- An arboretum is simply a wooded area where many different species of trees grow. It can be a designated area of the outdoor classroom or use the trees that occur throughout the site. Label the trees with signs that list name, characteristics, and common uses for the trees. For a list of trees native to the region of Arkansas look to the Arkansas Arboretum at Pinnacle Mountain State Park.

Archeological Dig Site- Students can learn archeological techniques while also learning local history to coincide with historical studies. Since there won't be a bounty of artifacts to dig, it will prove helpful to bury some the day before the activity or in between a day's studies on the site.

Bird Baths- They are a must have in your outdoor classroom. Birdbaths come in many shapes and sizes; it is up to the committee to decide which are best for the site. Hint: Use your imagination. There are many everyday items that can be turned into birdbaths. Make sure to keep all bird baths clean and well maintained.

Bird Feeders- Another feature that helps attract birds to the schoolyard. Depending on what type of birds you are trying to attract there are specific feeders for the job. However, several types of feeders will attract many different kinds of birds.

Butterfly Garden- Colors are the key to attracting butterflies. Bring together a collection of plants centralized around one another. It is better if they are all together rather than spread out. This creates an irresistible lure for butterflies. Another key to remember when planting is to use plants that will keep the garden in bloom for the full cycle of seasons (spring- azaleas, summer- buddleia, fall- chrysanthemums).



Brush Pile- Tree and shrub debris from clearing areas can be piled for birds and small animals to use as nesting sites and to hide from danger.

Compost Pile- An area can be formed in many different ways, or a commercial version can be purchased. This will allow for leaves, grass clippings, kitchen scraps, and other organic debris to be used to make nutrient rich soil.

Dinosaur Study Area- Trace the outline of different dinosaurs on the black top. Students can then compare their size to one another.



Erosion Control Site- Sloping ground can be separated with boards to make several plots. The plots should represent different types of ground cover situations: rocks, gravel, grasses, and bare soil.

Fence Row- Long-standing fences usually harbor many different items that can be studied by students. The soil is very undisturbed as well as having many different plants. This is a good place to talk about the spreading of plant life by birds.

Fossil Footsteps- Leaves, branches, and skeleton models can be used to create impressions in freshly poured concrete. It can be done in a concrete pathway or by making stepping stones with wood forms and using them in the gardens. This can be used to illustrate how fossils form or it can be a project for art.

Grass Plots- The variety of grasses seems endless. Creating several plots with different grasses can be used to teach the students the differences in the grasses, where they grow best, and what type of wildlife they attract.

Herb Garden- It only takes a small plot and it can be put anywhere there is a little sun. Lots of herbs are used for cooking or medicinal applications. Label the plants and list their uses.

Indian Theme Garden- This garden is just simply planting Indian corn, sweet corn, gourds, squash and wildflowers that can be cultivated. Find some Indian recipes and try them out or make dyes from the vegetables.

Insect Traps- There are many different devices used for insect traps some are as easy as a ripe banana in a jar; others contain pheromones that will attract certain types of insects. Students can learn the different body structures, or even use math skills to make population estimates for the area.

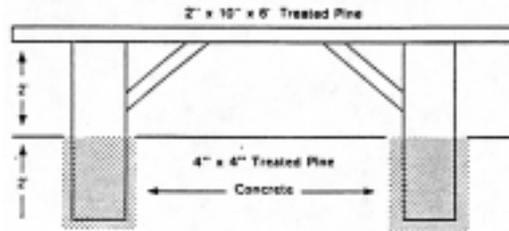
Nature Trail- If there is an area for a nature trail it can really draw the public to your school and to the work on the outdoor classroom. When building trails keep in mind to make it wide enough for two or three people to walk side by side comfortably. Points of interest should be along the trail to gather the whole class. The trail should be covered in gravel, wood chips, or other types of durable covering that is easy to walk on or move a wheelchair over. Do not forget signs for direction, labeling, and bringing attention to possible hazards, poison ivy, etc.

Nesting Boxes- There are many simple structures that students can build and place in suitable locations around the schoolyard. Consult with an area wildlife expert to find out the type to build. The nesting boxes will provide the students with an understanding of how certain types of small animals live. Also, you will add more wildlife to your schoolyard.

Orchard- Apples, grapes, blueberries, and strawberries can be planted and gathered by students. If the crops get big enough this project could prove to be a good fundraiser.

Ornamental Flowerbeds- Students can bring beauty to the schoolyard and feel a real sense of accomplishment when their flowers and bushes take bloom all over the school grounds. They can learn about the process of pollination too.

Outdoor Seating Areas- For teaching lessons create an amphitheater or a semicircle of benches. Seating can be accomplished by using railroad ties or old telephone poles (without the creosote), picnic tables, logs, landscape timbers, or constructed benches from treated lumber as shown below.



Pond- All water features bring so many possibilities to any outdoor classroom. Bring in your own wildlife to stock the pond with and others will just naturally be attracted. Talking with some area specialist can prove very helpful when planning the pond area. Keep the pond proportional with the amount of room there is to use for the outdoor classroom.

Reading Area- Sometimes it is a nice change to read a story to the class outside in good weather. Create a place to do this with a huge rock or some low benches. Surround this area with some shade trees or hedges and make sure it is buffered from the noise of the playground.

Rock Pile/Wall- Here is a great way to get the students involved and teach them about different rocks. Pile the rocks or form a wall with cement. This keeps the rocks in place. If the pile method is utilized try to keep the rocks bigger than throwing size.

Sensory Discovery Area- Certain plants with strong fragrances, unusual textures, or colorful blooms can be used along with feathers, furs, tree bark and rock to help students understand and develop their senses.

Soil Studies- Soils are one of our most important natural resources. Students should study the soils found on their school grounds. They can map out the area of the school and list the various soils from the different areas. Soil samples can be easily displayed in clear plastic pipes to show soils layers.

Solar and Wind Energy Workstation- As our population on this earth grows we grow shorter and shorter on energy sources. Two bountiful alternative sources are the wind and sun. Setting up small demonstrations for both of these types of power will educate youth about the need for these powers, and ways to use them.

Sundial- A sundial, one of the oldest instruments of science can prove useful in telling time of day, cardinal directions, and basic astronomy.

Tree Cross Sections- A tree cross section can illustrate a lot of details about a tree and its life. Some of these are fires, lightning strikes, insect infestations, disease, weather, competition from other trees, etc. It is very interesting when comparing these findings to local events from the past.

Tree Plantation- Students can learn many things about forestry through planting and raising trees. One project is growing the Virginia Pines for Christmas trees.

Weather Station- An old stump, thermometer, hygrometer, and rain gauge are all that is needed to construct it. A pole can also be put to use if there aren't any stumps available. Charting the daily weather can be an excellent lesson for science and math classes.

Woodland Clearing and Regeneration Area- Create a simulated clearing of a wooded area. This will allow younger trees to grow and attract wildlife and wild flowers.

This list will help provide some ideas for the outdoor classroom. Keep in mind the classrooms can be developed in phases, and learning stations can be added through the years.

Key Features For Arkansas' Outdoor Classrooms

Now that the plans for the physical appearance of the outdoor classroom and most of the planning for the different features is done, start putting together ideas for what to teach in this wonderful new extension to the classroom.

Outdoor classrooms are an extension of the indoor classroom and allow students an opportunity to explore and discover the environment. Another aspect of the outdoor classroom is that it provides a wonderful setting to take advantage of several state and national environmental educational programs (Project Learning Tree, Project Wet & Wild, etc). Teachers will be able to provide a rich, hands-on, experience driven curriculum with these projects and the outdoor classroom.

Some of the most common features asked for by Arkansas teachers are: cycle of life, erosion control, wildflower/butterfly gardens, bird sanctuary, water features, animal tracking stations, tree identification trail, wildlife habitat, amphitheaters and compost pile/recycling station. These workstations are where the learning begins and the source of the outdoor classroom's effectiveness.



Carver Magnet School, Little Rock

Cycle of Life

The cycle of life is an important lesson to cover with any age of students and it is easy to teach! One of the easiest examples to use is a tree's life cycle. There are probably trees existing in the outdoor classroom at different stages of the life cycle. Try to use them for examples and have the students relate the trees' stages to their own life stages, and the stages they still have to go through.

If trees are lacking for all the stages think about doing an activity to plant acorns "**seed**" in the cut off bottom of a milk jug. Then watch it "**sprout**" into what will become a "**sapling**." Transplant them to the outdoors eventually. That will cover the first three stages of life and for the last you might find a rotting log in the schoolyard. If not, bring a part of a rotten log in for class discussion. A rotting log in the outdoor classroom would be an ideal place to locate the cycle of life workstation. Point out to the students the insects, fungi, and decomposition that is going on. Describe how this process is nature's way of working the nutrients still left in the tree, back into the soil for other trees to eventually soak up. Sometimes there is a new tree starting right next to or inside the rotting log. This new growth would be a direct example of life regenerating itself.

Other activities can include having the students discuss the life cycle or history of a person. The important stages they can discuss are childhood, teenage years, young adulthood, and so on. Have the students write the stages down and the differences in responsibilities for each stage. Ask the students to do the same for a tree relating what they said about a person and the stages.

Students can make a tree lifecycle with art materials and share them with the class. Hang them on the wall to show to the rest of the classes. Don't just stick to the six stages in most lifecycles, involve injuries, stages of the tree as it begins to die or maybe even follow a tree that is being raised by people.

This is another activity that will help students think further about the life stages. Ask the students to imitate the following movements:

- **Curl up in a tight ball- you're a seed bursting to get out into the world.**
- **Uncurl and kneel- you've sprouted and are getting to see your first glimpses of light.**
- **Stick out an arm with your fist clenched- you've grown a branch.**
- **Wiggle your fingers- you grow lots of leaves.**
- **Stand up with your feet together- you grow tall.**
- **Spread feet out- you spread lots of roots.**
- **Start scratching all over- you're attacked by insects and fungi.**
- **Make a loud noise(kchhhhh!)- you get hit by lightning and lose a limb.**
- **Smile and sigh (ahhhhhh!)- you become home for wildlife in your old age.**
- **Make a hammering noise(Knock! Knock!) and vibrate- woodpeckers peck into your dead wood.**
- **Make a creaking sound and fall down- you blow down in a storm.**
- **Stick one arm up- a new seed has sprouted from your rotting wood.**

5) The sprout then grows larger into a sapling, which will grow to become an adult tree!



Sapling



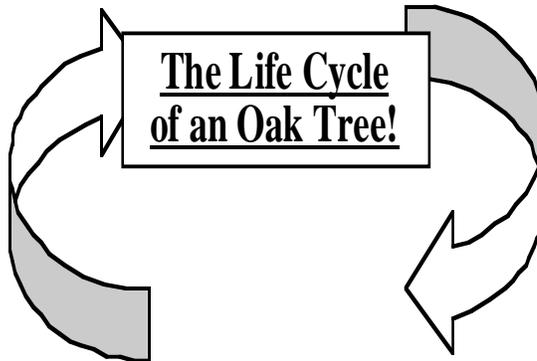
Mature Oak

6) A mature tree has all three life processes; photosynthesis, absorption, and respiration, going on at the same time.



Decaying Tree

The Life Cycle of an Oak Tree!



4) The roots grow into the soil and the shoot grows toward the sun.



Sprout

3) Seeds sprout and begin to grow.

Seeds



2) The seeds are distributed. Many animals help carry the seeds to new places.



Pollination

1) Reproduction occurs when the flowers of a mature tree work together. One flower makes the pollen and the other flower, when pollinated, makes the seed.

Erosion Control

Our country's topsoil is being carried away at an alarming rate by wind and water erosion. There are ways to slowing this process down and even trying to reverse some of the effects. The more awareness people have of this problem and what they can do to solve it, the better. A great place to start is with the students. An Erosion Control Demonstration Area, in the outdoor classroom would be a great way to educate the kids while they are still young.

The Erosion Control Demonstration Area is relatively simple to construct and easily maintained. Start with a 10' wide section of moderately sloped land or create one by mounding dirt in the area and compacting it until the mound reaches 3-4' in height. The section should not exceed 30 feet in width. Strip the surface of all vegetation down to the bare soil.

Next, divide the area into three equal sections. Leave one row exposed with nothing on it. Cover the next row with large stones and the next row plant in ground cover such as crown vetch. Nothing compares to having control measures present for the students to go by.

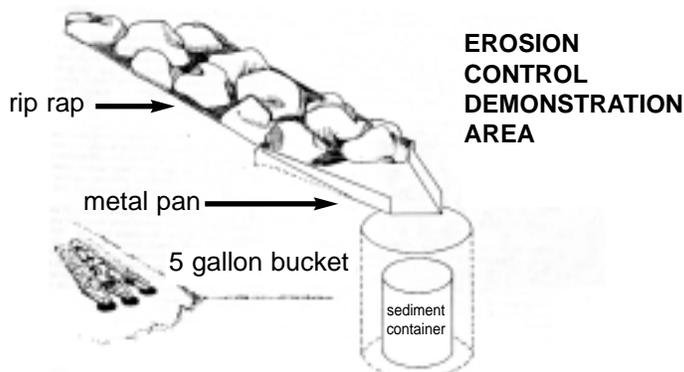
To keep track of the physical amount of erosion that takes place install collection plates at the base of each section. As shown in the diagram, dig a hole for the collection bucket to be submerged in. Leave enough space between the sides of the bucket and the sides of the hole to keep material from falling from the sides of the hole into your bucket.



This street was washed away by floodwaters from the stream to the right. Floods are where you see the quickest effects of erosion.



Farmland is one of the greatest areas where you see erosion.



Wildflower/Butterfly Gardens



Butterflies are found all over the world. There are 20,000 different species of butterflies and 200,000 species of moths. In North America there are 750 species of butterflies and 11,000 species of moths. In Arkansas, there are about 127 species of butterflies and 1,300 species of moths. May - August is the best time to look for them. How many species can the classroom attract?

Creating a butterfly garden is one of the easier and most rewarding projects to do in the outdoor classroom. It is surprising how easy it is to attract butterflies into the garden just by keeping a few important ideas in mind. Think of how much beauty butterflies would add to the garden. Using the following techniques there will be no problem attracting butterflies that will add bright colors and entertaining antics to the garden display.

Nectar-Producing Flowers

Butterflies need nectar, so when planning the butterfly garden make sure the plants picked produce nectar. The blooms of the flowers should be bright colored and have flat faces to land on. Ask a master gardener. They will be able to direct you to plants that fit this description. A list is provided at the end of this section.

Splashes of Color Everywhere

Butterflies are attracted by color. Make it easy for the butterfly to spot these plants by keeping them grouped together rather than isolated. A large colorful area of flowers looks more inviting than a small one. Colors to use for best results are yellow, orange, red and purple.

Flowers All Season Long

To keep attracting butterflies all season plant flowers in patterns so the garden will always have blooms. Select plants that will overlap each other's blooming period so the garden always looks inviting.

Sun Shiny Day

Remember when planning the location for the butterfly garden that these plants will need direct sunlight. Place some large flat rocks in the sun for butterflies to sunbathe on too. They do this to keep their body's temperature warm enough to keep active.



Butterfly Blanket?

Ever see a group of butterflies on the ground looking like a blanket? When approached they begin to fly away to reveal a puddle of water. If there is no puddle, make sure to include shallow areas of water in the butterfly garden. They use the area to get water and extract salts from the ground. Maybe it will become a "puddle club" in the butterfly garden.

Cycle of Life

It is important when creating a butterfly garden to provide plants for the butterfly through its entire life cycle. Plants in your garden that provide food for caterpillars will lure female butterflies to lay eggs in the area and create opportunities to see other parts of the butterfly's life cycle.

Warning!!!!

Do not, repeat do not use, any pesticides near the butterfly garden. Remember that butterflies are insects and pesticides will kill them just as easily as any other bug. There are predatory insects that can be introduced to rid the area of pests or remove the pest by picking them off the plants.

Wildflowers can easily be incorporated into the butterfly garden. In fact a lot of wildflowers provide food for all sorts of creatures. Plants for our region of the country are listed below.

Southeastern Wildflower Mix

Indian Blanket
Purple Coneflower
Scarlet Flax
Lemon Mint
Cosmos
Five Spot
Drummond Phlox
Tickseed
Rocket Lockspur
Dame's Rocket
African Daisy
Yarrow

Cornflower
Plains Coreopsis
Tuber Vervain
Black-Eyed Susan
Clasping Coneflower
Dwarf Red Coreopsis
Corn Poppy
Sweet Alyssum
Evening Primrose
Showy Primrose
Mexican Hat
Toadflax

Wildflowers are good to use in hard to maintain areas. They are very easy to care for and can be bought in regional mixes. Many sources will also do custom mixes if you want something in particular in your schoolyard (school colors, seasonal colors, etc.). The main idea is to add beauty and attract wildlife. To plant a wildflower garden you need to know the flowers and pick an area that meets their needs. A good place to start is with the **Arkansas Native Plant Society**.



Bird Sanctuary

Birds are a great addition to any outdoor classroom. In order to attract birds to the schoolyard do some simple planning and use the information provided in this section. Applying a few of these ideas will get you started in no time.

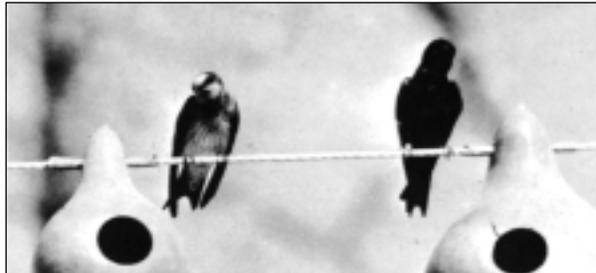
Birds, like any other living organism, have three basic needs: food, water and shelter. The object is to provide these things through natural means. Here is a list of different plant life that you can use to attract birds to your schoolyard

Shrubs for Birds

Common Juniper
Low-bush Huckleberry
Hollies
Sumacs

Vines for birds

Virginia Creeper
Wild Grape
Trumpet Honeysuckle



Flowers for Birds

Aster
Coneflower
Coreopsis
Sunflower

Trees for Birds

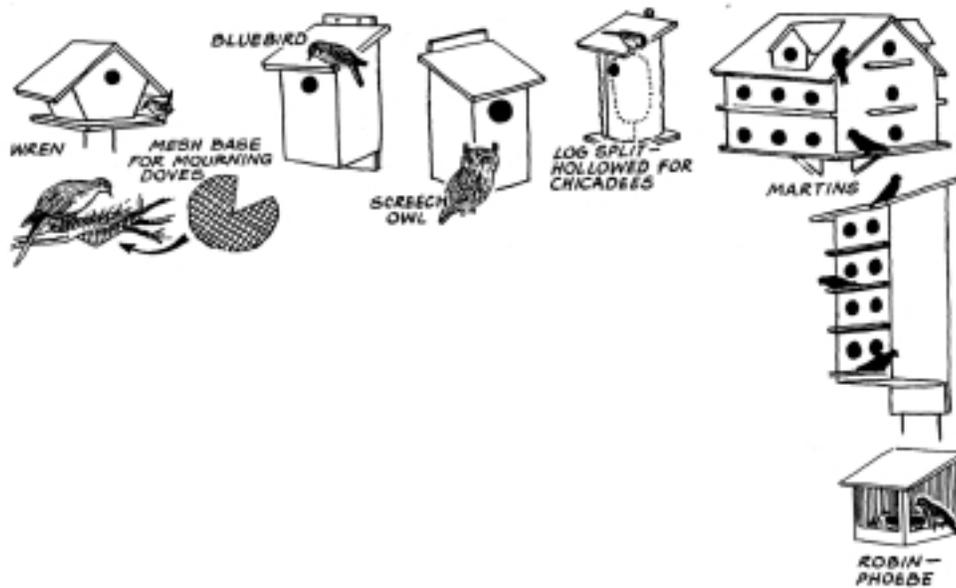
Apple
Black Cherry
Boxelder
Eastern Redcedar
Loblolly Pine
Sassafras
Persimmon
Sweetgum
White Oak
Sawtooth Oak
Possumhaw
American Holly
Shagbark Hickory
Redbud
Umbrella Magnolia
Red Maple
Flowering Dogwood



Most of these plants will provide birds with shelter and food. Another obvious food source is the bird feeder. There are many different varieties and price ranges on the market. Use the imagination of your students to make your own. There are many do-it-yourself plans for making birdfeeders. They can be made out of old soda pop bottles, milk jugs, pine cones, metal dust pans, etc. Construct your own out of wood and other building materials. Some examples can be found in the local library or at the Conservation Office. There are examples in many magazines like Southern Living, Better Homes and Gardens, and Birds and Blooms. Ideas and plans for feeders are everywhere! Make sure when trying to attract a certain species to research which feeder works best and what food to use.

There are literally thousands of ideas for birdhouses for additional shelter. The pictures on this page are prime examples of the many different types. Like birdfeeders there are many easy ways to build them. It is important to think about other competing species that keep away the species you are trying to attract. Reducing competition can be as simple as the hole size on the birdhouse or using different food that the competitors aren't interested in. Look for ideas on birdhouses in the same places as feeders.

Consider recruiting a teacher from the wood-working lab in your school district, with more experience, to cut the pieces for the birdhouses. Then you and your class can still put them together and decorate the houses. Don't let inexperience keep you from trying. Kids will have great pride in something that they built.



The most important item on the list to have for birds is water. This is commonly provided with birdbaths. Birdbaths can range from a simple shallow dish to fountains, drippers, misters, ponds, and everything in between. Birds do not like deep water. Most birds prefer water no deeper than 4". It is a good idea, even in a shallow birdbath, to place rocks for perching on while the birds are drinking. You will be surprised at the improved visitation. A maintenance tip for birdbaths is to use a stiff brush on the bath. Clean it about once a month or as needed and check the water level once or twice a week.

Water Features

Water is a very important aspect of plant and animal life in your schoolyard. Some schools already have a water source on their grounds such as stream or pond. Other schools provide water to their outdoor classroom with birdbaths and manmade ponds. A water feature is highly recommended for a great source of beauty and for wildlife activity in the schoolyard.

The most common request for many teachers is ponds and they are not that hard to build. It can be as simple as getting the right people together for a weekend to build the project. You will need these items: hose, shovel, pick, rake, wheelbarrow, level, tape measure, sand, pond liner, edging rock, and aquatic plants and fish.

First, get permission from the school administration before breaking ground. Then pick the best location for your pond. The pond should be: close to a water source, not under or near trees, away from utilities in the area (water, sewer, electric, phone, etc.), and in enough sunlight that the plants will thrive.

Now you are ready for construction of the pond itself. Construction can take place anytime of the year as long as the ground is not frozen or too wet. Take your garden hose and lay it out on the ground creating a natural shape for your pond. Avoid making the shape square, rectangular, or a circle. You want the pond to look natural. Mark the outline of the hose with spray paint. The paint will be your outline to work from when you start excavation. Think about the dimensions of the pond.

When you have decided on the outline remove the sod from the area inside the paint. Then you are ready to start excavating the pond. Around the edge of the pond leave a 1' wide and 6" deep shelf for anchor rocks to hold the pond liner. Add a second shelf for bog plants. Dig another shelf to the inside of that one if you want to have some shallow plants. This shelf should be 2" to 6" in depth and whatever width you desire. The rest of the area should be dug to the final depth.



Check the pond depth with a tape measure and level. Small humps and rolling slopes on the sides are desirable, but severe slopes can cause parts of the pond to be out of the water or too shallow for aquatic life.

Remove any rocks or other sharp objects from the area which might puncture the liner. Add 1" of moist sand and cover evenly over the surface. There are liner protectors you can use under the liner but sand has proven to be just as effective. You are now ready to place the liner in the pond. To get the right size liner you will need to take some measurements and do some math. Measure the ponds widest spot, longest length, and the depth. Multiply the depth by 3 and add it to the length and width.



If you have a 5' x 8' pond 2' deep you will need an 11' x 14' liner. Place the liner in the pond and weigh the edges with rocks or bricks. Fill the bottom of the pool and let the liner naturally sag into place. Smooth the remainder of the liner gently and fill the pool. You can add chlorine or similar agent to start with to treat the water. Ask about products that can be used where you get the liner.

Let the pool set 1-2 days before adding any aquatic life. The chlorine needs to evaporate from the water. You can landscape while you are waiting or build a waterfall feature or stream.



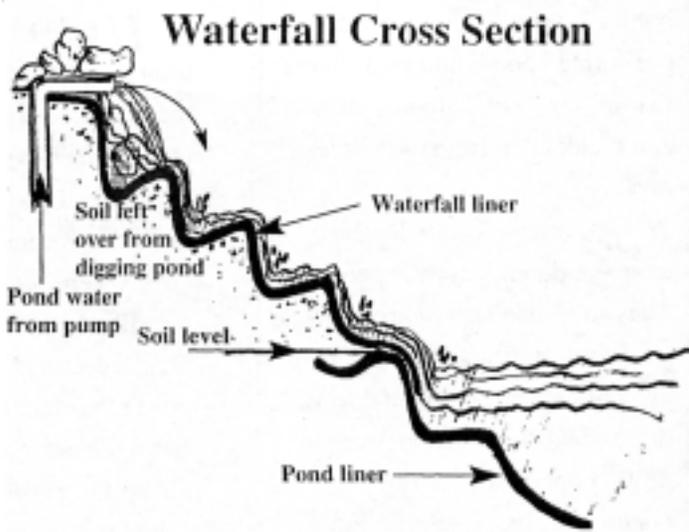
Other Water Features

Fountains and waterfalls are great additions to any pond area. There are several different plans like the one illustrated to the left. A waterfall is just another option though not a necessity for the outdoor classroom.

A pond might not be possible at your school due to the possible liabilities. Other options for water are birdbaths and fountains. There are many varieties and plenty of places to use them in every schoolyard. Rock fountains are a good way to create a moist environment.

Streams, creeks, and drainage ditches can be landscaped to incorporate them into the outdoor classroom.

Look at creating a marsh or bog type area around a drainage ditch that runs through the school grounds.



Animal Tracking Stations

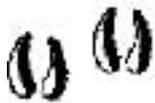
In Arkansas we have a large number of wildlife and sometimes it is hard to see them. With an animal tracking station you might not get a look at the animal, but you can see what they leave behind. Their tracks!

There are many ways to construct an animal-tracking site. The site should be by a water or food source making them more effective. The animal tracking site is constructed by spreading fine dirt or sand over a bare piece of ground near the food or water source. A plastic sheet can be used to kill grass in the area and keep it from coming back. Make the area at least 6' x 6'. It's ideal to cover a big area in order to get good results.

You can put a border around the site to keep people from walking on it. Nothing too high or elaborate, otherwise, animals will not cross it either. A sign is a good way to alert people to watch where they walk too.

The night before rake the area smooth and make sure there is plenty of food for your bait. The next morning check and see if you have any tracks. It's best to check in the morning before the tracks are disturbed. That's all there is to it!

Permanent tracks can be produced in a small concrete slab next to the sight for comparison. Simply build a frame 3' squared using 2x4's. Excavate the area to submerge the form, or you can screw plywood to the bottom of the form to make the stepping stones movable. Wet the form and pour the concrete into it. Follow directions on the bag for finishing. Before the concrete has completely set up create tracks with rubber or plaster casts. These casts can be purchased through a biological supply company. Once the concrete has dried remove the forms. If you used a plywood bottom for the base you will have a stepping stone that you can place anywhere.



Deer



Opossum



Beaver



Rabbit



Fox



Raccoon



Bear



Bobcat



Skunk



Squirrel

Amphitheaters

Amphitheaters are very popular with teachers. All age groups can benefit from the addition of an amphitheater at their school. It can be a very simple plan or very elaborate with decorative plants, flowers, shrubs, and vines.

The first step to creating an amphitheater is deciding what it is going to look like and finding a good spot for it. An amphitheater can be placed in numerous locations but the placement should be away from the playground or other distractions. It is understandable that the schoolyard may be crowded. You can always plant trees and shrubs to make a natural barrier between the amphitheater and distractions.

Amphitheaters sometimes carry a myth that they have to be these elaborate sitting areas with a stage big enough to hold a production or concert. This is the farthest thing from the truth. It can be as simple as some old telephone poles arranged into a circle or split logs for benches with a huge stump for the teacher to sit on. Seating is easy to build. If you decide to construct your own seating you might take a look at the plan below. It is relatively cheap and easy to construct.

The landscaping around the amphitheater takes the most imagination. A simple way to construct a background is by using a small three-sided trellis, or create something similar with 4x4 treated post and latticework. You can grow vines on it or leave it natural. Use raised flowerbeds to support the trellis.

It will not take much to wall in the seating area of the amphitheater. The seating area can be on the hillside and the hill serves as a natural barrier to the rest of the schoolyard. The amphitheater can be located in a wooded area using trees as a natural buffer. You can also use raised flowerbeds with taller shrubs at the back to block out distractions too. Consult with a landscaper to recommend a good low maintenance, thick, privacy shrub for a hedge.

With an amphitheater you can have outdoor story hours with librarians; hold a science class about sun gauges or solar energy; put on skits or short plays for Arbor Day; and have guest speakers from the Forestry Commission or other agencies come speak. A good amphitheater incorporated into the outdoor classroom activities will become the most used facility in the school.



Amphitheater at Devil's Den State Park.

Tree Identification Trail

You probably have a lot of native plants on your school grounds. When creating the outdoor classroom add them to the schoolyard to help educate students about their state's native plants. Trees are the biggest area for discovery and can be easily incorporated into a Tree Identification Trail on any size schoolground.

The first step in creating a trail will be planning the route based on the current inventory of the environment and future plans for the trail. These features can be compiled with student inventories or inviting a professional to give some ideas. Pick the features you wish to include in the trail. Plan a route that will run by these features. The features should include trees, Arkansas State Tree (Shortleaf Pine), waterways, or anything that will be of increased interest to users of the trail. This brings us to the next aspect of planning the trail. Think about the people that will be using the trail and the curriculum.

When choosing the route it is also important to try and avoid the following:

- _ Unstable fragile soils
- _ Steep slopes, bluffs, and cliffs
- _ Man-made hazards (wells, cisterns, mines, etc.)
- _ Dense vegetation requiring excessive clearing maintenance
- _ Endangered wildlife and vegetation
- _ Areas that flood easily
- _ Crossing waterways too many times

Before clearing starts walk the path with a list of planned features. The trail should flow where there is the least natural resistance. Map the path as you walk the route. Start planning construction layouts.

The map should provide a path surface of 5' wide with 1' to 2' of vegetation cleared on both sides of the trail. It should also show height clearances of 7' to 8'. Cover the surface of the trail with shredded mulch, very small gravel, flat large stones, tiny river rock, etc. Be sure the material is comfortable for people to walk on and handicap accessible.



Physically laying out the trail will take some temporary trail markers (flags, stakes, string), use of a compass, and an Albaney level. If you need assistance the District Conservationist should be able to help. Lay the proposed route by marking the path clearly with your markers. Adjust the path for gradients of steep slopes and obstacles that were not seen earlier. Walk the trail both directions with the list of features. Ask others to do the same and use their feedback to alter the trail.

Blend the trail around obstacles such as trees or large areas of dead trees and vary directions of the trail to avoid long straight lines. Try to space out the curves in the trail to avoid hikers taking short cuts across them. Plan open areas where people can rest and take a look around. Be sure the trail blends well with its natural surroundings. If possible try to give the trail a loop shape having the hikers begin and end in the same place. Try to avoid having hikers back track or hike previous trails.

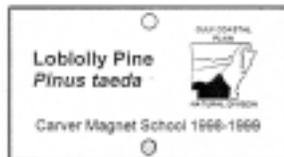
Now that construction crews can tell what the trail should look like and where it is supposed to be, it's time to clear the trail. Clearing a trail can be hard work. Try to have plenty of volunteers on hand the days you work. Set daily goals and have a plan of attack. Recruit area businesses to donate items for the volunteers' picnic lunches. The crews should have access to a first aid kit at all times. If they are using handsaws, chainsaws, etc. be sure the operators know what they are doing before they begin. Remind them that the idea is to make the trail blend with nature. All debris should be off the trail after clearing. In some cases, groups have made wood chips from the trees, and distributed other natural wastes in the wooded area. If vegetation on the sides of the trail is an obstruction to hikers selectively eliminate it. Contact the County Forester for assistance with building the trail.

Although it is not completed, once the initial clearing has been done the trail is ready to be used. Next, install drainage features and surface the trail. It can be surfaced with any of the materials listed previously. This has commonly been done with wheelbarrows and rakes or four wheelers with dump trailers. Either way will do fine. In grassy areas you might find simply mowing the trail area to be sufficient.

Surfacing the bare ground may not be enough to hold the soil in place. Areas should be assessed for erosion potential and measures taken accordingly. For methods of accomplishing this you can contact the Natural Resource Conservation Service. There are quite a few booklets on trail building, and you can contact the Arkansas Parks & Tourism Department for trail guidelines.



Harold Blaylock City Park, Plainview, AR



Once trail construction has been completed it is time to label the features. For tree and plant labeling there are tags as shown to the left that can be purchased or you can buy the stakes and make your own nameplates. You also need trail markers to keep your hikers on the right path. These can be as simple as colored stakes or as elaborate as carved wooden signs.

Although the trail described above may not be achievable for some school grounds there is always an opportunity for a smaller scale trail. Make a simple map with different visuals to aid the students in identification and let them experience the schoolyard. Develop the map in a trail form taking them around the schoolyard. Make signs for the trail and place them in the schoolyard. Never limit yourself.

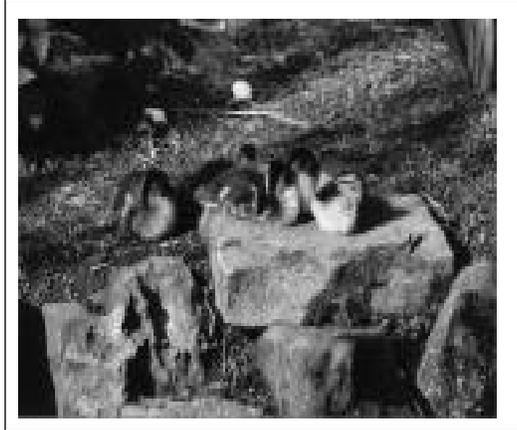
Wildlife Habitat

A wildlife habitat is a combination of all the subjects we have discussed up to this point. A good habitat meets all the needs of the area wildlife. A great deal of planning should take place to ensure that there is year round coverage, food, and water. These elements are essential to maintaining a wildlife habitat.

Water

Water is said to be the building block of life. This is because all of life relies on water for survival. With this in mind have a reliable source of water year round for all wildlife.

Some water features that are most commonly seen on school grounds are ponds, creeks, drainage ditches and birdbaths. It is important to keep them clean and the water level maintained. The placement is also important when it comes to nearby shrubs or other brush that might harbor predators. Try to keep a distance of fifteen feet or more from such areas.



Cover

Cover is important for animals and is often overlooked. Animals need cover for nesting, eating, and sleeping. They also use it to make safe traveling lanes for quick and safe travel. Good cover is a great method of bringing lots of wildlife to the same area. You will be amazed at the world you can find in thick shrubs and other cover.

A brush pile is an easy way to create good cover for small animals. Take tree branches, old Christmas trees, leaves, or plant clippings and pile them in the wildlife habitat area. Plant some dense shrubs or bushes. They create food for the animals and cover for a relaxed meal.

Large flat rocks and rock piles create cover and sun bathing spots for small animals and reptiles. The large rocks will attract sunbathers. Put them in direct sunlight.

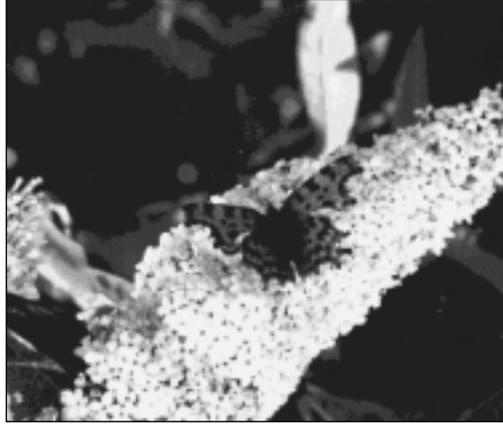
Nesting

Nature provides many places for animals to nest and raise their young and there are ways to create them for the wildlife. Commercial models of birdhouses or nesting boxes are available but there are several designs for building them as well.

Food

The best way to provide food for animals in your habitat is by natural means. Plan for the planting area in order to do a good job. Create a combination of plant life that will keep many different animals fed year round.

Shrubs and vines are very popular because they provide cover and nesting sites. Beautyberry, blackberry, honeysuckle, greenbriar, trumpet creeper, passionflower, Virginia creeper and wild grape are good plants to grow.



Flowers are the ever-popular addition to any environment. They provide food to an array of creatures as well as bringing beauty to the eye. Wildflower gardens are the most popular to create. Students can learn about the different uses of flowers by animals. Black-eyed Susan provides winter seed for birds, butterfly weed produces nectar for butterflies, and sunflowers provide everyone's favorite treat sunflower seeds.

Trees are another feature that serve multiple purposes for animals. Some trees are better than others for specific purposes. Talk to an expert on what trees would be best for the animal population in your area. Trees will be around for years and years so you want to make good choices. If you have any dead trees on the land, trim them back, but leave them standing to attract woodpeckers!

No matter how much you have planned for natural food sources there will be seasons with shortages of food. Feeding stations are recommended to attract animals. There are commercial versions but there are many things you can do yourself that cost very little money. Pinecones covered with peanut butter and rolled in seed are popular with animals. Turn an old milk carton into a regular pit stop for birds. Dried ears of corn are very popular with squirrels. Black sunflower seeds will attract all sorts of animals. Keep separate foods at different locations. There will be less competition between groups and more room for the intended groups to feed.

Think broad when you are planning to build your wildlife habitat. Regard the needs of the animals you are trying to attract and make sure they are provided for in the habitat.

Things to Think About

- If the habitat area is kept too neat it might detour animals from the area. Use conservation methods and let the area go through natural processes of cleaning itself.
- Use native plants when planting and avoid plants that will require extra care. Native plants primarily should be okay on their own with some occasional watering.
- Avoid using pesticides, which are harmful to animals and humans alike. Use natural means of pest control like ladybugs, bats and insecticidal soaps.
- Use mulch to cut down on weeding and watering.

Compost Pile/Recycling Station

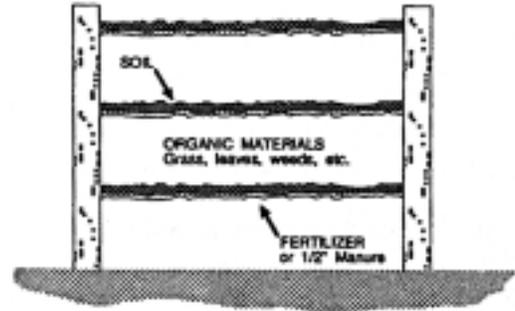
We are producing more and more organic waste as the population grows in this country and countries all over the world. Research shows that yard waste makes up 13 percent of what goes through our trash systems. Food wastes are another 10 percent. If we all turned our food and yard waste into nutrient rich soil we can cut our waste amounts by 25%. You ask how to do it? Composting!

Composting is the biological decomposition of organic matter. Decomposition occurs naturally, but it can be accelerated. Microorganisms, worms and insects break organic materials into compost. Compost contains nutrients that are used by plants when returned to the soil. This is nature's way of recycling.

All composting should be done following basic principles. Composting of any kind should be done in layers. The very bottom layer should be comprised of shredded branches, pinecones, etc. measuring about 8"-10" deep. This larger material allows air circulation at the bottom of the pile and in-turn creates a chimney effect when the temperature of the pile rises. This layer should be moist but not soggy.

Add a 1" layer of fertilizer or manure. Cover the organic debris as much as possible. Good coverage will bring higher temperatures, and less pest problems (if you are using food waste in your layers); both leading to better results. There are inoculums and compost starters but they are not really advantageous to the process. There will be enough microorganisms from your yard wastes for decomposition to occur. Save your money for something else.

The following layers should be made with leaves, grass clippings, and anything else you decide to put in your compost. Again, 8"-10" of organic material then 1" of soil. Continue this layering till you get a 3'-4' tall pile. There are several resources on what is good to use in compost. There are tables that will explain the different ratios to improve the quality of your compost. Some great resources are at your local County Extension Office.



A composting program can be done in several different ways: compost pile method, wire and wooden bins, garbage can methods, turning bin method, and wood-and-wire three-bin system. Other methods will work too. It just depends on what kind of composting you prefer.

Composting Piles are the simplest. Start by preparing a place on the ground by loosening the soil about 5' wide and to whatever length you want. Make layers as described above. The pile should be at least 3' in height. It is important, if using food waste, to turn the pile regularly or keep it covered with a layer of mulch to keep the pests away. It is a good idea to have at least two piles. That way you can turn one while adding to the other.

Wire and Wooden Bins are simple, inexpensive containers for your compost. The idea behind containing the compost is that it holds the pile up allowing more air filtration to occur and it is easier to construct layers. It also looks neater. The least expensive wooden bin can be constructed from old truck pallets wired or nailed together. Used pallets are often available at wood manufacturers. You can use new pressure-treated lumber to construct a 3'x3'x3' box. If you are constructing it be sure and use pressure-treated lumber. Wire units are easy to construct. Take a 10' piece of wire fencing 36" wide, and make the fencing into a round bin and tie the ends with wire. Set it in place. For added support, stake it with wooden or metal post in the ground around the inside of the wire.

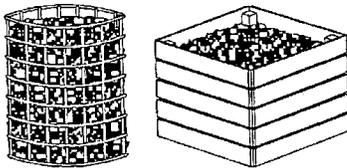


Figure 1. Examples of units to hold yard and garden wastes until composting is complete.

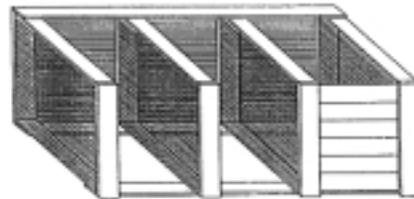


Figure 2. A series of bins used to speed composting.

Garbage Can Composters have been used for a long time and don't take up a whole lot of space. If used for garden wastes they have to be turned which can be a chore. To construct, take a trash can and drill rows of 4 holes about six inches apart. The holes and the number of rows should allow good airflow throughout the trash can. When finished put a 2-3" layer of wood chips or sawdust in the bottom to absorb extra moisture. There you have it, a garbage can composter.



Turning Bins, or tumbling compost are becoming more common. They are more involved and a commercial tumbler can cost quite a bit. Plans are available to construct your own more economically. This is the quickest type of composting. This process requires a full load of compost at one time. It is not something you can add to once the load has started. The system requires good ratios of carbon to nitrogen, so you will need a chart to figure them out. The benefit of this type is that you get compost in as little as two weeks. All you have to do is give the barrel a turn once a day.

The **Wood-and-Wire Three-Bin Turning Compost Bin** is a lot to say in one breath, but easy to construct and use. There are do-it-yourself plans available that describe how to construct them. It is much like the single units but the system allows you to process larger amounts on a faster schedule. Start a pile of compost layered as usual. After it has set for a few days the temperature in the compost will reach 130-140 degrees Fahrenheit. A few days after that the temperature will start to drop. Measure the temperature with a compost thermometer. This is when you will turn the pile into the next bin repeating the process. When it is complete you will have rich, fertile soil. As you move the pile across start a new pile in the first bin.

There are many lessons students can learn no matter which method is used to compost. They can learn how the chemical energy of debris changes into heat energy when debris is being broken down. They also learn how worms and insects feed on the debris to make compost and how nature replenishes itself naturally. These are just a few lessons to teach while you are on your way to nutrient-rich compost.

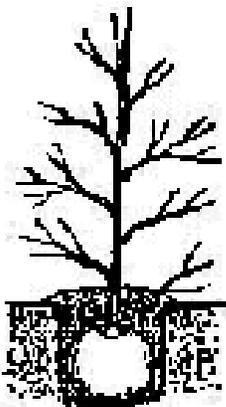
Twenty Questions You Might Ask When Buying a Tree



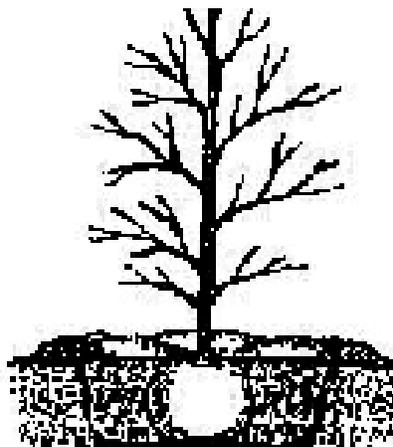
- 1) Is the tree especially susceptible to diseases or to damage by insects?
- 2) Does it need acid or alkaline soil?
- 3) How can I make acid soil alkaline and vice versa?
- 4) Does it need a dry area or a wet area?
- 5) How big will the tree grow and how fast?
- 6) Should it be planted close to the building or other trees or does it need open space?
- 7) Can I plant flowers under the tree?
- 8) Does it need special care in the first few years?
- 9) Will it produce nuts, fruit, cones, or colorful leaves, or flowers that I can use?
- 10) Will it provide shade in the summer and winter?
- 11) Is the tree more smog resistant than other trees? Be sure to find out if you are planting along a major highway.
- 12) How far should I plant it from sewer or drain lines, sidewalks or a driveway?
- 13) Does it have shallow or deep roots, and how well does it withstand winds?
- 14) Can it serve as a windbreak, noise barrier, or visual screen?
- 15) Does the tree need full sun, partial shade or complete shade?
- 16) Will it encourage wildlife and birds to live in the area?
- 17) Will it drop many seeds in the area, causing a crop of sprouts come spring?
- 18) Is it noted for shedding leaves year round?
- 19) Will it fit in well with the area landscape?
- 20) Will the tree withstand cold and hot weather?

Tips For Proper Tree Planting!

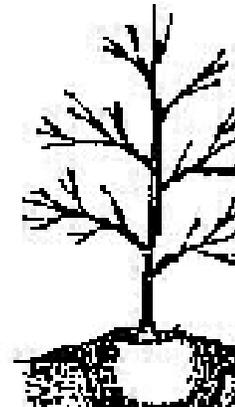
- 1) Never carry trees by their trunk because it will break the roots and reduce the amount of water the tree can absorb.
- 2) Be sure to keep the roots protected from the environment whether they are in a container, balled and burlaped, or bare root.
- 3) Keep plants watered while in storage.
- 4) In preparation for planting, it is best if the hole can be dug prior to planting and filled with water so the ground will be saturated around the tree.
- 5) The planting area needs to be tilled 3 to 5 times the size of the root ball to promote healthy tree growth.
- 6) The planting hole should be 2 times as wide as the root ball and the existing soil line should be at the same level as the root collar on the trunk.
- 7) The sides of the hole should be gouged to prevent a sheer edge.
- 8) Carefully cut back the burlap and remove any wire baskets, ropes, or plastic twine from around the trunk and roots. Containers should be completely removed and the roots loosened if root bound.
- 9) Lower the tree into the hole by the root ball not the trunk.
- 10) Soil from the hole should be chopped, textured, and redistributed around the root ball. Soil amendments may be mixed with the soil if it is of poor quality- be sure they are thoroughly mixed.
- 11) Soil from the hole should be adequately tamped around the root ball.
- 12) The original soil level on the trunk should correspond with the finished grade.
- 13) Soak the ground thoroughly to insure that the root ball is saturated.
- 14) Mulch the soil surface with 3-4 inches of a coarse material such as shredded bark compost. Mulches should not be placed directly against the tree trunk.
- 15) Broken branches should be properly pruned at the time of planting.
- 16) All materials should be removed from the plant to prevent future girdling.



Planting Too Deep



Proper Planting



Planting Too Shallow

Planning Maintenance For Your Outdoor Classroom

Maintenance is one of the most important aspects of your project. It is the most long-term. You will find that working with the groundskeeper for the school will prove helpful. It will be easier to plan for the maintenance on the site. They should be involved in the planning process.

Maintenance must start from the very beginning of the design stage of your project. Each feature you plan should list the long and short term maintenance needs of that project. Design the features in your outdoor classroom to be as low maintenance as possible. If a feature is too high maintenance you might reconsider its importance.

Ideas to include in your maintenance schedule:

January



Keep bird feeders full and well maintained
Transplant shrubs and trees.

February



Finish transplanting,
and prepare soil for annual plantings.
Maintain bird feeders.
Be sure to have water available for the wildlife.

March



Clean out nest boxes.
Repair any winter damage.

April



Start planting annual plants for flower, garden and wildlife plots.
If needed use sprinklers to water beds similar to 1" of rainfall.
Put out hummingbird feeders.
Remove grass and weeds around trees or
where trees are to be planted.
Reinstall the pump in the pond.
Check around pond for damage or areas where
liner is exposed.
Spray any fruit trees.
Set out insect traps.
Have spring clean up of the schoolyard.

*April is a big month for work in your outdoor classroom. You might want to set up a Saturday with volunteers to get a lot of projects done in one day.

Maintenance Continued

May



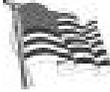
Weed all gardens.
Check the insect traps.
Clean out the birdbaths.
Take down and clean bird feeders, and store until next season.
Time to prune the pines.
Mulch trees to protect them in the summer months.

June



Check the insect traps.
Keep the hummingbird feeders full.
Harvest any spring crops that are ready.

July



Weed the gardens.
Make sure that all plants and animals have enough water.
Order tree seedlings from Arkansas Forestry Commission .

August



Harvest all summer crops.
Repair, repaint, and restrain all structures that need it.
Check the insect traps.
Work all planting plots and plant your fall crops.

September



Finish planting all fall crops.
Check the insect traps.
Ready animal tracking plot if you have one, if not create one!

October



Thin bulbs, corms, and tubers.
Plan locations for new trees.
Take down the insect traps.
Pumpkins should be ready for harvest and carving!
Harvest your crops before the frost hits.
Pull up the annual herb garden after the first frost hits.
Have the fall clean up.

November



Take down hummingbird feeders.
Set out bird feeders.
Remove the pump from the pond.

December



Prune deciduous trees except bleeders-consult a forester for proper tree care.
Keep all bird feeders full of seed.

Other general maintenance projects include trail construction/repair; mowing grass and checking water levels in ponds and birdbaths. These are some of the activities that need to be done in the schoolyard. You may find that making a detailed calendar of day to day activities will prove helpful in keeping organized. Keep in mind when planning maintenance, you don't have to do it all by yourself.

Example Activities

Ideas for activities can be found in endless publications. Take a look at the resource pages at the back of this booklet for good places to start. There are several activities already prepared for teachers, and others are still waiting for you to put together. Some of the best activities come from ideas that teachers write down to give to others.

In this section there are a few activities to be used for the classroom. These can be worked into a lot of different aspects of the outdoor classroom.

The Incredible Journey

Objectives: Students will describe the movement of water within the water cycle and identify the states of water as it moves through the water cycle.

Materials:

9 large pieces of paper

Marking pens

9 boxes 6"x6" these will be the game pieces.

Procedure:

You will need to make 9 stations that will represent water at a point in the water cycle. You will also need to label the 6 sides of each block as listed below.

Soil	one side plant one side river one side ground water one side clouds two sides stay	Lake	one side ground water one side animal one side river one side clouds two sides stay
Plant	four sides clouds two sides stay	Animal	two sides soil three sides clouds one side stay
River	one side lake one side ground water one side ocean one side animal one side clouds one side stay	Ground Water	one side river two sides lake three sides stay
Clouds	one side soil one side glacier one side lake one side ocean two sides stay	Glacier	one side ground water one side clouds one side river three sides stay
Ocean	two sides clouds four sides stay		

To begin the project the students are all give a piece of leather or yarn. You should instruct them to tie a knot on the one end. They can then be divided into groups or they can do the project on an individual basis. Each station should have at it a container with a colored bead that represents that part of the water cycle. When the students arrive at each station they should add one of these beads to their bracelet. Since each bead is colored differently the children will have a colorful bracelet form which they can tell the story of the water cycle. It is also helpful to make up a sheet with the different stages on it. Then the students can also map their path, and be able to retrace it a little bit easier. For a writing exercise you can have them write their journey down.

This activity was taken from the Project WET Curriculum and Activity Guide, page 161, and brought to our attention by Melissa Johnson of the Sebastian County Conservation District. Thanks Missy!

I Spy an Animal

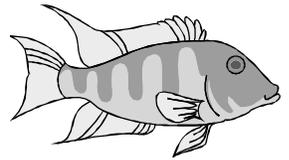
List below the animals that you see on the playground and Outdoor Classroom.



- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____
- 6) _____
- 7) _____
- 8) _____
- 9) _____
- 10) _____
- 11) _____
- 12) _____
- 13) _____
- 14) _____
- 15) _____



- 16) _____
- 17) _____
- 18) _____
- 19) _____
- 20) _____
- 21) _____
- 22) _____
- 23) _____
- 24) _____
- 25) _____
- 26) _____
- 27) _____
- 28) _____
- 29) _____
- 30) _____



**TREE LIFECYCLE
WORK SHEET**

Fill in the information for various stages or events your tree's life-cycle.
Describe at least three stages or events.

TYPE OF TREE (COMMON NAME)

SCIENTIFIC NAME

CHARACTERISTICS OF TREE

LIFECYCLE STAGE OR EVENT

TREE AGE

ROLE IN FOREST ECOSYSTEM

LIST OF THINGS TREE DEPENDS ON TO SURVIVE

LIST OF THINGS THAT DEPEND ON THE TREE TO SURVIVE

PROCESSES THAT MIGHT MOVE TREE INTO THE NEXT STAGE

LIFECYCLE STAGE OR EVENT

TREE AGE

ROLE IN FOREST ECOSYSTEM

LIST OF THINGS TREE DEPENDS ON TO SURVIVE

LIST OF THINGS THAT DEPEND ON THE TREE TO SURVIVE

PROCESSES THAT MIGHT MOVE TREE INTO THE NEXT STAGE

LIFECYCLE STAGE OR EVENT

TREE AGE

ROLE IN FOREST ECOSYSTEM

LIST OF THINGS TREE DEPENDS ON TO SURVIVE

LIST OF THINGS THAT DEPEND ON THE TREE TO SURVIVE

PROCESSES THAT MIGHT MOVE TREE INTO THE NEXT STAGE

LIFECYCLE STAGE OR EVENT

TREE AGE

ROLE IN FOREST ECOSYSTEM

LIST OF THINGS TREE DEPENDS ON TO SURVIVE

LIST OF THINGS THAT DEPEND ON THE TREE TO SURVIVE

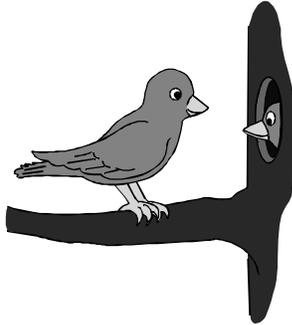
PROCESSES THAT MIGHT MOVE TREE INTO THE NEXT STAGE

Matching Trees and Uses

Draw a line to match up the type of tree with what it is used for.

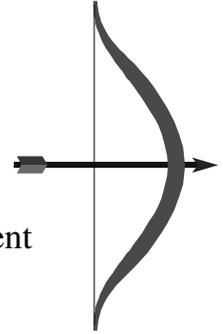
Trees

1. Flowering Dogwood
2. Ginkgo
3. Eastern Red Cedar
4. Osage – orange
5. White Oak
6. White Ash
7. Sugar Maple
8. American Sycamore
9. Shagbark Hickory
10. Shortleaf Pine
11. Black Walnut
12. Black Cherry



Uses

- a. Longbow
- b. Baseball Bat
- c. Musical Instrument
- d. Floors
- e. Building Homes
- f. Home for Wildlife
- g. Fruit for Birds
- h. Furniture
- i. Medicine
- j. Maple Syrup
- k. Nectar for Bees
- l. Ladders



Forestry for Kids

Answers: 1.(g) 2.(i) 3.(f) 4.(a) 5.(d) 6.(b) 7.(j) 8.(c) 9.(i) 10.(e) 11.(h) 12.(k)

TREE DESCRIPTION

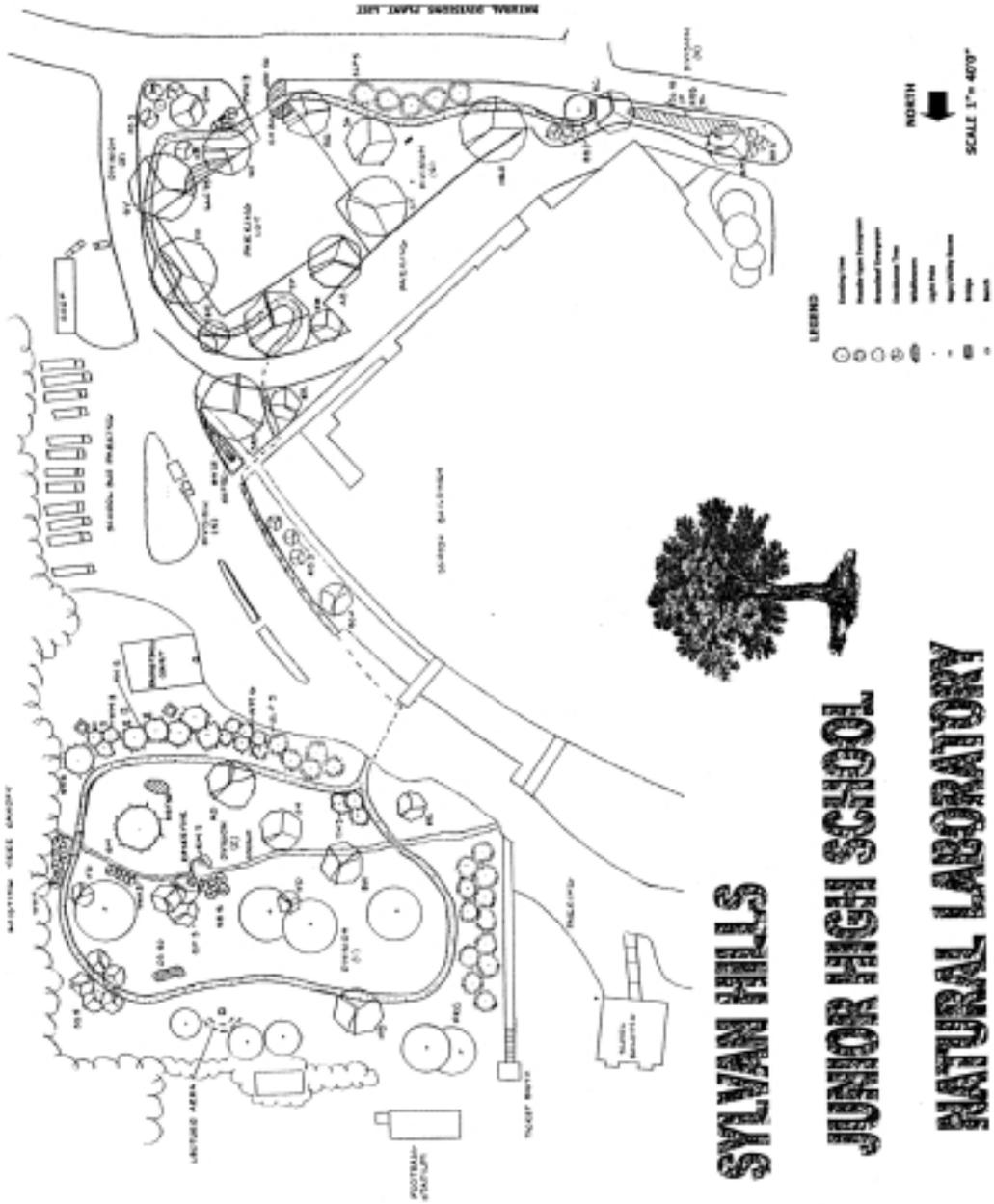
Flowering Dogwood	A small native tree that requires light shade. It blooms in spring with large white flowers and has bright red berries in fall which birds love to eat. The tree is planted in lawns as an ornamental.
Ginkgo	A prehistoric tree dating back 150 million years. The tree has a fan-shaped leaf that turns a gold color in the fall. It has been discovered that parts of the tree have medicinal benefits and is sold as a supplement.
Eastern Red Cedar	An evergreen tree with sticky scale-like leaves. The tree's branching habit creates a "Christmas tree" look, which provides a wonderful shelter for animals. The wood is used for pencils, posts and furniture.
Osage-orange	Also know as a Bois d'arc or Hedge Apple. A large tree with a strong yellow wood. The fruit is eaten by animals. The wood is prized for longbows.
White Oak	A tall shade tree with large acorns. The tree provides a high quality lumber that is used for floors, furniture and ship-building. The acorns are an important source of food for wildlife and especially deer.
White Ash	A large shade tree that grows in moist soils. The fruit is a "winged" seed pod and is a good source of food for birds in the winter. The wood is used for baseball bats, doors, musical instruments and outdoor furniture.
Sugar Maple	A beautiful shade tree with brilliant colored leaves of yellow, orange and red in the fall. In the northern states maple syrup is produced by the tree. The wood is used for furniture and flooring.
American Sycamore	A massive tree with a beautiful white and grey mottled bark. Hollow trunks are large enough for bear dens. The fruit is a small fuzzy ball that hangs from a stem and has seeds eaten by birds. The wood is used for musical instruments, boxes and butcher blocks.
Shagbark Hickory	A tall straight tree with unusually shaggy bark. The nut has a sweet edible kernel that is eaten by squirrels. The wood is very strong and is used for ladders, tool handles and furniture.
Shortleaf Pine	An evergreen tree with leaves like needles. The tree grows tall and straight and is grown for its lumber and is used for building homes. The seeds from the pine cones are eaten by birds and rodents.
Black Walnut	A large, open tree with dark wood that is very valuable for furniture. The wood is used for pianos, gun stocks and flooring. The kernel in the nut is used in cookies and candy. It is also enjoyed by squirrels and birds.
Black Cherry	This tree has clusters of white flowers in the spring that produces nectar or bees. The flowers turn to tiny cherries and are eaten by over 30 birds and other animals. The wood is valuable for cabinets.

SYLVAN HILLS JUNIOR HIGH SCHOOL
NORTH LITTLE ROCK, ARKANSAS

NATURAL LABORATORY MASTER PLAN

ARKANSAS FORESTRY COMMISSION
PREPARED BY: PATTI S. ERWIN
SEPTEMBER 8, 1999

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
○	1" DBH						
○	2" DBH						
○	3" DBH						
○	4" DBH						
○	5" DBH						
○	6" DBH						
○	7" DBH						
○	8" DBH						
○	9" DBH						
○	10" DBH						
○	11" DBH						
○	12" DBH						
○	13" DBH						
○	14" DBH						
○	15" DBH						
○	16" DBH						
○	17" DBH						
○	18" DBH						
○	19" DBH						
○	20" DBH						
○	21" DBH						
○	22" DBH						
○	23" DBH						
○	24" DBH						
○	25" DBH						
○	26" DBH						
○	27" DBH						
○	28" DBH						
○	29" DBH						
○	30" DBH						
○	31" DBH						
○	32" DBH						
○	33" DBH						
○	34" DBH						
○	35" DBH						
○	36" DBH						
○	37" DBH						
○	38" DBH						
○	39" DBH						
○	40" DBH						
○	41" DBH						
○	42" DBH						
○	43" DBH						
○	44" DBH						
○	45" DBH						
○	46" DBH						
○	47" DBH						
○	48" DBH						
○	49" DBH						
○	50" DBH						



SYLVAN HILLS
JUNIOR HIGH SCHOOL
NATURAL LABORATORY

Where To Get Additional Information

National Organizations

Wildlife Habitat Council
301-588-8994
E-mail: whc@wildlifehc.org

EPA
Public Information Center
401 N St., SW
Washington, DC 20460

Izaak Walton League
1401 Wilson Blvd. Level B
Arlington, VA 22209

National Audubon Society
Education Office
Rt. 4 Box 171
Sharon, CT 06069

National Wildlife Federation
1400 16th St., NW
Washington, DC 20036-2266

USDA
Forest Service
P.O. Box 1963
Washington, DC 20013

Keep America Beautiful, Inc.
9 West Broad St.
Stamford, CT 06902

National Institute For Urban Wildlife
P.O. Box 3015
Shepherdstown, WV 25443

USDA Natural Resource
Conservation Service
3913 Brooken Hill Dr. Ste 200
Fort Smith, AR 72908-9289
501-646-6256

State Organizations

Arkansas Forestry Commission
3821 West Roosevelt
Little Rock, AR 72204
501-296-1940

Arkansas Game & Fish Commission
#2 Natural Resources Drive
Little Rock, AR 72205

Arkansas Water and Soil Conservation
Commission
101 East Capital, Suite 350
Little Rock, AR 72201
501-682-1611

Arkansas Urban Forestry Council
P.O. Box 809
Fayetteville, AR 72702
1-800-958-5865

Arkansas Department of Environmental
Quality
8001 National Drive
Little Rock, AR 72209
(501) 682-0744

Arkansas Department of Parks and Tourism
One Capitol Mall
Little Rock, Arkansas 72201
1-888-AT-PARKS

University of Arkansas,
Cooperative Extension Service
2301 S. University Avenue
Little Rock, Arkansas 72204
Phone 501/671-2000

References

- American Forest Foundation. Environmental Education Activity Guide. Washington D.C.: Project Learning Tree, 1993.
- Carmen, Sam. Guidelines and Features for Outdoor Classrooms. Indianapolis: Indiana Department of Natural Resources Division of Forestry, 1992.
- Dillon, Olan W. Invite Birds to your Home. Washington D.C.: US Department of Agriculture Soil Conservation Service, 1975.
- Edlin, Herbert L. The Tree Key 235 Species Described. New York: Charles Scribner's Sons, 1978.
- Herrin, Misty B. Georgia Schoolyard Wildlife Habitat Planning Guide.
- Hirrel, Suzanne Smith, Tom Riley, and Dr. Craig R. Andersen. Composting. Fayetteville: University Arkansas Division of Agriculture Cooperative Extension Service.
- Koehler, Cynthia Iliff, and Alvin Koehler. The Wonder Book of Trees. New York: Wonder Books, 1964.
- Leedy, Daniel L., and Lowell W. Adams. A Guide to Urban Wildlife Management. Columbia: National Institute of Urban Wildlife, 1984.
- Lenz, Lisa. Trees for Kids 1997. Iowa State University: University Extension, 1997.
- Long, Alan, and Anne Todd-Bockarie. Trails, Bridges, and Boardwalks. Gainesville: Florida Cooperative Extension Service University of Florida, 1994.
- Megalos, Mark A., Robert Williamson, Scott Payne, And Barry D. New. Schoolyard Environmental Projects "A Planning Primer." 1996.
- National Arbor Day Foundation, The. Celebrate Arbor Day Guidebook. Nebraska City: The National Arbor Day Foundation, 2000.
- Neelands, R.W. Important Forest Trees of the Eastern United States. United States Department of Agriculture-Forest Service. Western Publishing Company, 1968.
- Pierce, Robert A. Artificial Squirrel Nests. University of Arkansas Cooperative Extension Service, Leaflet 524.
- Robinson, George, Alan Kesslheim, and Sausan Higgins. Project Wet Curriculum Guide and Activity Guide. "The Incredible Journey." Bozeman: Watrecourse and The Council for Environmental Education, 1995.
- Georgia Forestry Commission. Schoolyard Nature Centers. Macon: Georgia Forestry Commission.
- United States Department of Agriculture. Plant a Tree for Your Special Occasion. United States Department of Agriculture, 1981.
- USDA Natural Resources Council. Backyard Conservation. USDA Natural Resources Council, National Association of conservation Service, and Wildlife Habitat Council, 1998.



Arkansas Forestry Commission

John T. Shannon, State Forester

Author:

**Victor Dreier, Research Assistant
College of Education, University of Arkansas**

Edited by:

**Patti S. Erwin, Urban Forestry Coordinator
Arkansas Forestry Commission**

The Arkansas Forestry Commission offers its programs to all eligible persons regardless of race, color, national origin, sex, age, or disability and is an equal opportunity employer.