

## **Lion's Pride: A Case Study in Urban Wildlife Habitat at Yates High School**

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### **INTRODUCTION**

Most inner-city schools, especially high schools, have drab, dreary, desolate looking surroundings. It is as if, in their immediate environment, they have adopted the appearance of penal institutions. There is no decent looking landscape, but instead a total absence of shrubs and flowers or things that would aesthetically enhance the immediate surroundings. It is no wonder discipline runs awry in most inner-city schools.

I think all this can be changed for the better with gardens and habitats, enhanced by brightly colored flowers that attract bees, butterflies, and other creatures of nature. Flowers and such would encourage the idea that great minds are molded here with love and appreciation for nature, life and, beauty.

I believe that all schools' inner courtyards should have a habitat where lessons in environmental science, biology, botany, and such can be given in a very practical manner within the school compound. Math, engineering, technology, and even construction can utilize such gardens for maximum educational benefits.

Students would learn how to appreciate and commune with nature daily and would hopefully develop understanding and love for life other than their own. As teachers, there is a lot that we can do to mold the minds of our students by encouraging such endeavors. Therefore, I plan to create a unit that entails designing and building a nature center in the school courtyard. The students, through research, will design and construct the center. They will study plant life, gardening, and other necessary subjects that deal with constructing a nature center. After building the nature center, the students will study the plant, animal, and wildlife there.

All in all, the nature center will assist the students in understanding science, develop in them an appreciation for nature, encourage them to examine examples of what they study in science class, and at the same time add beauty to their school's environment.

### **The Importance of Teaching this Topic**

Completing this lesson will cultivate in my inner-city students an awareness of life other than human life. By so opening up my students' minds, this unit will allow them to appreciate many of the things they take for granted: water, food, and shelter. They will begin to see how important and challenging it is for birds, bees, insects, plants, and animals, and they will get a sense of how these creatures live in their natural environment, be it on land or under water, hot or cold, dry or wet.

The experience gained in this lesson will be lifelong as students' can take what is learned and adapt it for use in their careers should they so desire. The students' academic skill will be enhanced through the research they will do. Other activities designed to develop their skills will include the site visits they will make, the guest speakers who will be invited to speak to them, and of course learning about birds and their habits, butterflies and their characteristics, and animals and their that must contain existence, whether in the wild or in a controlled environment.

## **BACKGROUND**

Every human has a preferred home that must contain certain resources to meet one's needs for health and survival. The same conditions are true of wildlife in general. Animals' resources are: food, in the form of nuts, seeds, berries, fruits, leaves, nectar, vegetation, insects and other prey; water, in the form of oceans, rivers, lakes, creeks, bayous, wetlands, ponds, manmade sources, and even birdbaths; shelter, which is an important requirement for escaping from predators, and avoiding adverse weather. Shelter is also important for nesting, and it consists of trees, tall grasses, shrubs, and manmade structures on land or under water. All of these resources are critical for a healthy habitat.

In addition to the right habitat, all species depend on each other to survive. A sure way to identify any wetland is by walking on the edge of a pond; if your boots get stuck in the mud, you are definitely in a wetland. Here in Texas we like to call this wetland soil "gumbo," but the environmental term is "hydric soil," which means the soil is waterlogged and holds water because of its thickness and high clay content.

Three characteristics identify wetlands: 1) wetlands are hydric (water-holding) in nature; (2) they have hydrophytic plants (plants that live in wet soil or water); and (3) they exhibit some form of hydrology (how does the water flow, where does it come from). In Houston, there are numerous wetlands, such as Sam Houston State Park, Armand Bayou Nature Center, Jesse Jones Nature Center, Houston Arboretum, Sheldon Lake State Park, and Brazos Bend State Park to name a few. All of these are freshwater wetlands. To see coastal wetlands one must go to Galveston Island State Park. Two of the simplest ways to tell the difference between freshwater wetlands and coastal wetlands are to taste the water (not recommended) and to look to see if there are any palmettos or other marsh-type plants in the area, because they identify wetlands.

There are enormous bio-activities in wetlands that serve many necessary functions critical to the health of our city and state. They assist with maintaining a high level of water quality; plants and soil clean the water before it returns to rivers or underground waterways. Wetlands are flood buffers and erosion control agents by acting as detention areas for floodwaters during heavy rains, stabilizing banks and reducing shoreline erosion. Wetlands have always been recreational areas, but recent developments have made them the fastest growing segment of the tourist industry, supporting hunting, bird

watching, and fishing. Because plants like palmettos, needle grass rush, cord grass, key grass, and black mangrove abound, wetlands are a natural habitat for many species of wildlife—ibises, egrets, herons, fish, shrimp and crabs to name a few.

With the destruction of vast numbers of wetlands, many people have built backyard habitats with little or no idea as to what they are doing and what kinds of animals might inhabit the environment they have created. As a result, they are very surprised when they find unexpected animals in their sacred environment. They seek to destroy unwelcome animals completely. In such poorly designed areas, plants and shrubs native to the area are usually left out and replaced by beautiful flowers unsuited for the area. Few of the essentials necessary for animal survival, such as food, water, and shelter, remain in this new, artificial habitat. Bird feeders of the wrong kind attract birds other than the desired ones. All across the United States, thousands of farmers are establishing wildlife habitats on parts of their farms. Making all this possible is a legislative package called the “Farm Bill.” Officially known as the Federal Agriculture Improvement and Reform Act of 1996, the bill awards farmers monetarily for growing or not growing certain crops and includes environmental objectives, which are primarily the reduction of soil erosion and establishment of habitats. The law’s most outstanding feature is the Conservation Reserve Program (CRP), which rewards farmers for planting native grasses and trees on highly erodible lands instead of crops. Millions of trees and acres of tall grasses have been planted as a result. Once a farmer enrolls in the program, he is bound by a 10-year agreement to keep the land unfarmed. In Illinois, where a total of 25.6 million acres of tall grasslands once existed, only 2,600 remain today. In North Dakota, approximately 75 percent of mixed grassland prairies have been destroyed.

More than 50 of America’s original 224 million acres of wetland have been lost to cropland, negatively affecting approximately one third of the bird population and some 900 animal species dependant on the wetland environment for survival. Many factors are responsible for this devastation. Urban encroachment on habitats, flood control or lack of it, weather, and farming are to be blamed. Some 13 species of grassland birds made the Texas list as either threatened or endangered species. Among other species are the burrowing owls, meadowlarks, loggerhead shrikes, kingbirds, swift foxes, dickcissels, and savannah sparrow.

The Washington, D.C. area is experiencing its own share of challenges from new residents whose homes are now occupying the wildlife habitats of the area. These residents are doing things they hope will attract only one kind of animal, but are unaware that other animals eat the same food and will come to partake of the feast. When the unwanted animals show, residents seek to have them eliminated. The problems are escalating as some 750,000 acres of farm and forestlands will become residential home sites to some 300,000 people by 2005. Private organizations such as the Wildlife Rescue League are currently providing assistance to homeowners and injured animals alike. They are seeking to educate the residents and protect the animals at the same time.

Despite the apparent conflict between residents and wildlife, we know that in the United States, wildlife watching generates some 29 billion dollars annually. Studies have shown that animals left in the wild are more valuable than those used for food or game. In the Texas town of Rockport, approximately 1.2 million dollars are generated annually by bird watchers coming to see some 200 whooping cranes arrive for their winter stay. On the other hand, the United States and Canada share more than 200 annually scheduled, nature-oriented festivals that attract more than one million visitors. Thus, habitat designs and reputation represent an economical value as well as spiritual value (“Wildlife Watching” 26).

These thoughts engaged my mind when the search for business partners and willing participants for the creation of a Yates Nature Center began. The idea was brought to the students. They overwhelmingly approved. The result is a nature center designed by students for students.

Jack Yates High School, home of the “Mighty Lions,” celebrated 78 proud years this 2004 school year. The school was named in honor of the Revrend Jack Yates, a well-respected religious minister. He was the first pastor of the first black Antioch Missionary Baptist Church in Houston. On February 8<sup>th</sup> 1926, Yates High School became the second African American high school to open its doors to students. The school was moved from an earlier location to its present one, where it sits between the University of Houston and Texas Southern University and has developed strong working partnerships with both as well as with Houston Community College. Today, Yates is home to some 1400 students, of which 91% are black, 8% are Hispanic, and less than 1% are Asian and white. Located in the third ward, the school has a long tradition of outstanding athletic and academic excellence. Low-income, single-family, inner-city students with parents who have little or no post-secondary education and earn \$20,000 or less annually typify Yates.

Mrs. Debbie Rhodes of Natural Legacy and Ms. Diana Foss of Texas Parks and Wildlife were the first two people to give wholesale encouragement to the nature center idea. Typical words of encouragement from them went as follows: “If your school principal does not readily endorse the idea, do not give up.” “The children, once they buy into the idea, will do the talking for you.” “Be sure, though, to maintain your regular curriculum activities.” Mrs. Rhodes and Ms. Foss put me in touch with the following business partners: Tree Search Inc, Micro Flow Industries, the Nature Plant Society of Texas, Stephen Rolowicz Irrigation Station, and Charlie De Leon.

The Yates Nature Center, with its four-foot tall wire fence, is approximately 60 feet long by 50 feet wide; the pond, quite small by most standards, is 25 feet by 22 feet with a liner three feet deep layered with three inches of dirt and sloping edges. One might say that the habitat is average-sized.

Although the project began about four years ago and almost all of the original students have graduated, expansion will continue. Since then, we have enjoyed steady

growth and development. The project, as seen presently, is a 10,000-dollar investment, most of which comes from the Texas Parks and Wildlife Department as well as other federal and state funding. Seven of our students have benefited from Texas Parks and Wildlife internships. In 2002, four students worked in a joint program with Texas Southern University in constructing a habitat for the university next to the new technology wing, under the guidance of Dr Jonathan Lewis. In 2003, because Texas Parks and Wildlife reduced funding, only three students received internships, with an emphasis on advanced training, including PowerPoint presentations. We are now capable of training teachers and students at other schools to develop habitats. One such training is now under way at the Benbrook Elementary School. We have received requests from other schools for assistance with their habitat design and construction.

We have had visits from the National Wildlife Federation director based in Austin and from a group of some 18 teachers from different school districts within Texas. On June 2, my students and I were to host 10 biologists from all over Texas. They obviously were very impressed with our maintenance of the wildlife center and said that most ponds they have visited are allowed to be overrun by weeds.

I would like to encourage other teachers to seriously consider adopting a program such as ours. Your students will benefit tremendously from the experience. You and your students will gain respect from the entire school community and will attract unexpected assistance from the public that will definitely help your program. One word of caution: never “go solo” with this project. Involve the entire school, because it makes the job so much easier, especially when it comes to construction and maintenance. The benefits are tremendous. Even our school maintenance man is in on the act, checking the electronic watering system to make sure all is well during our vacation.

We started this program with a very simple objective: “Provide students an environment built by students for students that will expose them to nature and the natural evolution of life in general, and to give them a place to relax, observe and enjoy life.” I have always made it a policy of mine never to judge anyone. I always say to my students, “I did not ask for you and you did not ask for me either, but since we are put together, let us cooperate so you can graduate.” I also let them know that I care what happens to them, for I am here to help. Like most teachers, I have challenging moments, and I have great times, too. In 2000, students saw fit to have my name included in “Who’s Who Among America’s Teachers.” I am deeply grateful for their consideration. During my time at Yates, I have attended funerals for two of my students who died about one month apart of each other. I was devastated by the sorrow. I kept going on because it is all about the students and not at all about me. At no time did we expect, as a result of our nature center, to have an audience with Senator John Kerry, the Democratic Presidential candidate, who was scheduled to visit the center on Earth Day, but had to cancel the visit. Instead, our audience with him took place at the University of Houston where we told him all about it. They interviewed the Yates Habitat team on one of Houston’s most popular radio stations (KTRH), where we shared our habitat with the

public. We have had a number of TV stations visit our nature center (including channels 11, 13, 8, and the Houston Independent School Media), and the Houston Chronicle, on two separate occasions, interviewed the students about the work they did and the benefits gained from the experience. On June 2, 2004, my students participated in the annual Swap and Share Best-Practices for Service Learning sponsored by the Region IV Education Service Center in Houston, Texas.

The Yates Mascot is the mighty lion, and the students lived up to the expectation most fittingly. They recalled and recited their stuff; they cooperated and made an outstanding impression. The focus was on them, and I was the observer. Happy and pleased, I was proud of the outcome.

When we provide our young people the right incentive, with clear directions and no-nonsense expectations, they have no excuse for failure. Once the teacher helps students to understand and visualize the possibilities, we will see positive results. They will be successful and proud because, from the onset, they were part owners of the idea and the project. It was not a teacher-only idea; it was students doing something for students. They were helping themselves. These were the very students who helped draw up the master plan. They were the very same inner-city students whom I saw climbing frantically onto the tables the day an uneducated field mouse entered the classroom from underneath the door. His education was short-lived and decisive. Amidst all the noise and frantic cries, he stood in the middle of the room, spun around a few times, and decided to make a hasty retreat the same way he entered. Neither he, nor his relatives, have shown up since to complete the education. We now jokingly say we have only one drop out—the mouse. I do not dare tell them that I think the little fellow is somewhere in the habitat raising his family. Some things are better left unsaid, I believe. A large majority of students are now demonstrating a strong appreciation for this environmental construction class; it is fun, they say. If I were to allow them their wish, every class period would be spent in the garden. Do not misunderstand; I still have a few who want nothing to do with the habitat. To them, it is a matter of not wanting to get their hands dirty, and they are privileged to keep them that way. For a grade, they do other assignments. Do not be discouraged, because you will never win them all.

### **TIPS FOR A SUCCESSFUL HABITAT**

Try to make your habitat similar to the natural one by layering the vegetation you plant in the habitat. Your choices should include tall trees and short trees, undergrowth, perennial shrubs, and grasses for ground cover. It is a very good idea to inventory your habitat each winter to ensure varied and sufficient vegetation for the wildlife species to nest, rest, and escape from predators. Rocks with crevasses, wood stacks, compost piles, rotten logs, and dead trees will serve as food, shelter, or nesting hideaways to many wildlife species. Some local trees and vegetation are Barbados cherry laurel, coral berry, live oak, and southern myrtle. Native food sources are best. Artificial food in bird feeders should only be used as a supplement. Animals that use feeders have very peculiar habits, and

every effort must be made to ensure that the dimensions, structure, and size of the feeder fit the species of animal you are trying to attract to your habitat. Having a pond in the habitat is an excellent water source and will serve as a good year-round water supply. Be sure the pond has sloping sides for easy access. Birds and small animals prefer open, gentler, shallow access for drinking and bathing. In this way, they are able to see their predators and escape surprise attacks.

### **Steps for Building a School Habitat**

1. Plan the location of the habitat and evaluate the site.

Pick a location if you have that choice; if not, prepare to make the available location a place where water, food, and shelter are easily accessible. Consider all the things you can do to enhance the area to make it as natural as possible. How close and accessible is the water source? Is a birdbath needed and adequate? Based on the animals that will be in the habitat, will conditions be adequate for sustained life? What can be done to improve conditions? Get all the help you can when making these decisions. See the bibliography on "Schoolyard Habitats program takes root at pilot sites sponsored by NWF, Dannon." They provide an information kit and a planning guide.

2. Evaluate the site's suitability as a habitat and its potential for education and curriculum development.

Is the location safe and the space adequate for student class visits? When students visit, what will they be learning, and what will be the high point of their visit? Would the site benefit all classes or just a few? Can anything be done to improve and expand the benefits for more students? Sometimes, teachers with habitats at their schools can attend classes that will train them how to become more proficient in using habitats for teaching students. They may even be rewarded with school materials that can be used when in the habitat.

3. Take inventory of the site and create a base map/master plan.

What natural things are available, and what things must be added or removed to improve the site? The base map will show where things will go: plants, trees (large and small), flowers, grasses, pathways, the pond, birdbath(s), birdhouses, etc. All things considered, is the site adequate for the inhabitants? Will they survive all seasons, or will replanting of trees, shrubs, and flowers be necessary? This will help with replacements should that become necessary.

4. What is the purpose of the habitat? Make clear objectives and goals.

Will the habitat be a haven for butterflies only, or will it accommodate several species of animals? Will there be a pond for fish? If so, you should research carefully the kinds of

fish. Will it be used for educational purposes or is it just a sanctuary for the animals, a place to relax and commune with nature? Is the food chain adequate for the survival of all the species you might want to have in there. Spell out specifically what all will be included in the habitat, and build to attract specifically the kinds of animals you want there. Develop a time frame for when each and every task will be done, including planting, watering, and cleaning schedules. Include days for work parties, time for assignments, rotation schedules, safety-training schedules (which are absolutely necessary), and any other schedules deemed necessary. Always have a plan, and work the plan.

5. Create a master plan outlining the kind of habitat and its educational purposes

Take into account the shape of the habitat, the location and size of pathways, and accessibility issues for the physically challenged. Fenced or open area should be easily accessible. Consider water accessibility and how you plan to use water; types of plants; and species of birds and animals. Estimate the number of people who will occupy the space at any one time and design for that. Who would be using the habitat and for what classes? Will there be varied instructional opportunities available?

6. Divide the master plan into workable phases and give each phase a priority.

Remove grass and prepare and section off the ground for planting areas and walkways. Measure and mark off pathways with borders. Set specific days for digging and planting. Set the date and time for digging the pond if there will be one; know how large and deep it will be; and know whether there be a liner and, if so, what kind and shape it will be. Have the pond liner available for placement in the pond. Have plenty of newspaper or other liners available for layering ground before placing mulch stones, etc. I recommend that the liner for pathway and the crush stones on walkway be the last things done.

7. Find committed students, business partners, and parents to help with the project.

Inform and invite all school organizations to participate in the construction. (These groups can be very important for the long-term survival of the project.) Provide incentives for students such as attendance credit and community service awards. Other incentives include food, extra credit, photo shots, and certificates of appreciation for parents and businesses. Other recognitions, like placing students' names in strategic locations in the habitat, can also work wonders. In short, do whatever is necessary to motivate the students and their parents to participate. Do not be afraid to ask teachers, parents, and businesses for what you want—food, tools, labor, etc. The sooner you know what will be donated, the better; then you can plan to cut costs. Be sure to give everyone a schedule and keep them informed and up-to-date. Be prepared to coordinate all activities and give ample time for others to prepare. Have someone take notes and pictures before and after.



8. Prepare for implementation, installation, and construction. Decide on start date and end date.

Have a plan and work the plan. Know in advance who will do what and when. Try to pick your team leaders very early, and give them written instructions so there will be no confusion. Keep team size to no more than four or five. Be flexible. Friends sometimes work together, but then again, they can pose problems. Reassign whenever necessary. At my school, pizza is a favorite with students. Be sure to put a strong person in charge of this department and keep the food away from the work site; if you are not careful, everyone else will eat but the very conscientious workers. I usually assign a teacher, a student, and a parent to the task in order to get the job done. Plenty of water is a must. I strongly recommend you use the small bottles because it eliminates waste.

9. Schedule regular publicized workdays and build partnership with teachers and students to encourage participation in the site construction and maintenance.

One cannot undertake and accomplish a large project such as ours by him/herself. The Yates Nature Center is approximately 60 x 50 feet and the pond is a mere 22 x 25 feet with a liner three feet deep layered with three inches of dirt and sloping edges. It is an average-sized habitat. Completing such a project on time required the participation of several people. I asked teachers to assist in supervising students and provide water and food on scheduled workdays. Always open and flexible to ideas from others, since it gives them ownership and makes them willing participants.

10. Develop a maintenance plan for the site and implement the plan after construction has been completed.

Set up a regular maintenance schedule and be specific as to what will be done when and how you want it done. The more specific you are, the better. For instance, not everyone knew where the plastic pipes were laid during weeding; many pipes were damaged because holes were accidentally punched through them. We spent lots of time doing repairs that could have been avoided.

## **CONSTRUCTION MANAGEMENT AND OBSERVATIONS**

When asking for assistance from a student, teacher, or parent for your habitat construction, be specific and always give a start and end date. Develop a plan and work the plan. Be sure to make an inventory of all tools you will need, and set about the business of making sure they are available on each workday. Businesses may donate some, parents may lend you some, and you may have to purchase some. Set up a tool room with rigid controls. Pliers and things with sharp edges have a tendency to grow legs very quickly and never return. Tape measures and some goggles tend to do the same. I usually put a teacher and a student in charge of this area. Do not forget to check your inventory after every workday, well before everyone leaves. Have your students

make posters announcing the events – including the date, time, and type of work that will be done – well in advance, so that helpers can come dressed to work. Otherwise, many will come with the wrong type of clothing or shoes and work will be slow or will not get done. The number of students needed, the number of teams, and how many students in each team must be emphasized. It is strongly recommended that any workday on the site begin with a safety review. Make sure all students understand the importance of following safety instructions. Be vigilant and accept no excuse unless you know for certain that the procedure will not work because of the lack of proper tools or limitation of equipment, in which case you should let the experienced people handle the task. On our busiest workday, we had some 200 students working in rotation and 20 or more observing and making sure safety was never compromised. We did not have a single accident. During a workday in the garden at my school, we almost always had a girl in charge of making sure there were no tools lying around. Sometimes a boy might leave a rake lying around with the sharp ends facing up, and things like that can pose a major danger to such a person as and to others. Girls would never fail to catch that as well as other things most boys take for granted. Girls seem to be more methodical at some of these tasks. At your school, you may find that a different model works better. With these general steps in mind, you are ready to embark on the habitat building exercise. Once the habitat concept is adopted, it should be used for education (as well as its general aesthetic and soothing value).

The following are specific lesson plans that can be applied anywhere on a habitat at any stage of implementation.

## **IMPLEMENTATION STRATEGIES**

### **Classroom Introduction to Nature Centers**

By assessing the extent of student's knowledge and interest, the teacher will get a fairly good understanding of how much the student really knows about the subject matter and how the lesson should be presented. The teacher will begin with a series of questions, both closed and open-ended, so that all students can have an opportunity to participate. The teacher will avail himself/herself of all opportunities to increase student comprehension and participation. At the end of each lesson, all students will discuss the key points of the lesson and complete a review sheet. Guest speakers from the Texas Parks and Wildlife Department, the University of Houston, and the University of Texas Environmental School of Science must be invited to participate by speaking to students and sharing their knowledge, experience, and skill. For us, they explained such things as the food chain and water pollution and its effects on the planet. They even brought a construction site model to show the effects of poor planning and the problems caused by erosion. The students were engaged in research on wildlife habitats both in the library and during off-site nature center visits. The teacher may continue to assess students' knowledge and interests. In many instances objective were developed after reviewing the subject matter. Since the habitat is ongoing, students were asked to draw and express in

writing what they had seen and learned, thereby affording the teacher an opportunity to evaluate and correct any misunderstood information. Continued research and needs assessment were done to enhance student learning. Students began to demonstrate their understanding and knowledge of the subject area. They were able to state and discuss very satisfactorily that while there are many different kinds of habitats, there are certain places where wildlife can better sustain themselves with food, water, shelter and the birthing of their young.

With this knowledge, they were in a position to make decisions on what kind of habitat they would like to have in their school. They were also ready to decide what kinds of animals, insects, birds, and plants they wanted. To have or not to have a pond was another consideration for the students. They were finally in a position to give positive input. Interest ran high, and many of the quiet ones began to voice opinions. It was then that homework assignments became very important in terms of getting parental involvement. With their new understanding, students were able to visualize possibilities. I sat back, listened, and maintained order. It was at this point that I began to select teams and team leaders unknown to the students.

They continued writing about their ideas and understandings. Students who did not like to write began to align themselves with people who took notes and leadership in groups. I made adjustments and transfers to accommodate some students' wishes based primarily on observation. We were now setting up to work from a research and knowledge based foundation to an application and process mode. If I had to do it all over again, I would pay more attention in selecting team leaders and employ much the same tactic, would have more team leader meetings, and would follow the lesson plans more closely.

### **Typical Results**

Before I present my lesson plans, I want to briefly mention the attached copy of a newspaper article (Markley) on our habitat (see Appendix One). I have entitled this section "Typical Results" to illustrate that such an article, while not the goal of the unit, is a milestone that is realistic. The article chronicles most of the ideas in this curriculum unit and in my case is the credential that makes the Yates case study a believable concept.

## **LESSON PLANS**

### **Lesson One: Habitats – What are they? Why are they important?**

#### ***Objectives***

- Students will be informed of the basic requirements and expectations of the program.
- Students will become aware and knowledgeable of the term "habitat."

### ***Teaching***

- Identify wildlife species found around Houston and possibly on your campus.
- Identify specific habitat and food requirements for each wildlife species.
- Discuss relationships between wildlife, plants, and habitats (food webs).
- Discuss native plant species – why they are important and their use in landscaping.
- Discuss why habitat is important, including the problems of urbanization, habitat loss, loss of species diversity (historic and present). Also, discuss how these problems affect people's lives.
- Determine what constitutes habitat (food, water, shelter, space) and lay out steps students can complete to create a habitat on the school grounds.

### ***Resources/ Materials***

Students will be escorted outside to make observations and identification of wildlife, plants, and habitats in their natural environment. They will use charts for recording their findings.

### ***Teaching/ Re-teaching***

Upon returning to the classroom, students will again discuss their findings and make comparisons for reinforcement of habitats and their importance

### ***Modifications***

Allow extra time for discussion and completion of information sheets.

## **Lesson Two**

### ***Focus***

Habitats – take a field trip and view examples of natural habitats at Tree Search Farms Wholesale Nursery at Sheldon Lake State Park.

### ***Objectives***

- Students will be informed of the basic requirements and expectations for the field trip.
- Students will improve their understanding of the terms “habitat” and “natural environment” through experience.

### ***Teaching***

- View examples of a natural habitat; see how it's structured and used.
- Begin thinking about the features they want to see in the Yates habitat design.
- View various landscape designs on the ground and discuss the pros/cons of each design.
- Use cameras to capture design elements and techniques as well as specific plants for use when designing the Yates habitat.
- Discuss design techniques to satisfy wildlife and people visiting the area.

- Watch horticultural propagation techniques and processes used to grow native plants for commercial sale.

***Resources/ Materials***

- Experts in the field of plant and wildlife habitats will guide students on the tour.
- Students will observe and identify the many different plants and wildlife habitats in their natural environment.
- Students will use charts for recording their findings and conclusions.

***Teaching/ Re-teaching***

Upon returning to the classroom, students will discuss their findings and make comparisons for reinforcement of habitats and their importance. They will also make some basic decisions on what their desired habitats should look like.

***Modifications***

- Extra help in identifying plants and wildlife.
- Extra time for discussion and completion of work.

**Lesson Three**

***Focus***

Habitat Design – Second field trip, with an emphasis on habitat components, including food, water, shelter, and space.

***Objectives***

- Students will again be informed of the basic requirements for a natural habitat.
- Students will begin basic design of their own habitat.

***Teaching***

- Review habitat components (food, water, shelter, space).
- Complete survey and inventory of the proposed habitat site at your school; look at soil type and environmental conditions.
- Work in teams to measure site dimensions in preparation to draw habitat design.
- Make a list of features (those that benefit wildlife) to include in habitat design, e.g. berry plants, nectar sources, water sources.
- Make a list of features (that benefit people) to be included in habitat design, e.g. benches, shade tree, pathway, signs, etc.
- Work in small teams to research plants, with emphasis on aesthetics, wildlife benefits, people benefits, growth requirements, and ease of maintenance.
- Work in teams to begin group sketch of habitat design.

### ***Resources/ Materials***

- Students will benefit from the experience of experts in the field of plant and wildlife habitats.
- They will make observations and identifications of many different plants and wildlife that will be suitable for the Yates habitat.
- They will also use charts and graphs to record their findings plans and conclusions.

### ***Teaching/ Re-teaching***

Upon returning to the classroom, students will again discuss their findings and make comparisons to reinforce habitats and their importance. They will make some basic decisions on what their desired habitats should look like.

### ***Modifications***

- Give extra help in identifying plants and wildlife.
- Allot extra time for discussion and completion of info sheet.

## **Lesson Four**

### ***Focus***

Students will implement final landscape design.

Outside work: Students will install edging and place soil in raised areas.

### ***Objective***

Students will again be informed of the basic requirements for a natural habitat.

### ***Teaching – Bed Installation***

- Students will interpret final landscape design and work outside, installing edging and placing soil in raised bed area.
- Students will place labeled flags in the exact location where various trees and shrubs will be installed.
- Students will begin the irrigation installation.
- Students will review the “plants availability sheet” provided by two local nurseries. They will crosscheck the sheets with our final plant list and order shrubs/trees from wholesale nurseries.

### ***Resource/ Materials***

- Students will benefit from the experience of experts in the field of plants and wildlife habitats.
- They will make observations and identifications of many different plants and wildlife that will be suitable for the Yates habitats natural environment.
- They will also use charts and graphs for recording their findings and final plans before installing beds.

### ***Teaching/ Re-teaching***

Upon returning to the classroom, students will again discuss their fieldwork and make final changes for enhancement of the Yates habitat. They will make some basic decisions on what the desired habitats will look like. Students will explain the habitat's effects and benefits to the rest of the Yates student body.

### ***Modifications***

- Give students extra help identifying where things go.
- Give students extra time for discussion and completion of final work sheet.
- Discuss the benefits of the work done today.

## **Lesson Five**

### ***Focuses***

- Digging trenches to place pipes for the rain watering system and preparing beds for plants and shrubs.
- Reviewing and implementing the final landscape/habitat design. In doing so, make sure the majority of features desired for wildlife and people have been included as per the approved plan.

### ***Objectives***

- Students will again be informed of the basic requirements for a natural habitat.
- Students will continue preparing the ground for the irrigation system and for bed installation, paying particular attention to measurements according to the approved plan and reviewing the final design of the habitat.
- Determine final plant list with different plant species, cost of each plant, number and width of pathways/edging/soil materials, etc.

### ***Teaching – Plant Installation***

- Unload plants from truck and place each plant next to its appropriate flag.
- Demonstrate proper planting techniques for trees and shrubs.
- Spread mulch over beds.
- Discuss necessary maintenance of the plants and assign student maintenance teams.
- Discuss signage needed and determine design of such and whether it could be created using school equipment.

### ***Resources/ Materials***

Students will benefit from the experience of observing the expert from Micro Flo Industries by laying a watering system and bed installation for plants and wildlife habitats. Students will make observations and identifications of many different plants and their colors (school colors?), including wildlife that will be suitable for the habitat. They will also use charts and graphs for recording their findings, plans, and conclusions.

***Teaching/ Re-teaching***

- Upon returning to the classroom, students will discuss their findings and use the experience to prepare for the final stages of the habitat.
- Students will make comparisons for reinforcement of the appearance of the habitat and its importance.
- Have detailed discussion on what the desired habitat should look like.
- Plan for concrete stepping-stones to be manufactured by students.

***Modifications***

- Give extra help in identifying plants and wildlife.
- Allot extra time for discussion and completion of info sheet.



## APPENDIX

# For Yates students, nature is a hop away

## Habitat is their answer to urban sprawl

By **MELANIE MARKLEY**  
Houston Chronicle

In the middle of the Yates High School campus, surrounded by the usual chaos of student life, Devron Zeno takes refuge in a different world.

The quiet corner of the school's inner courtyard — set aside with a pond and native blooming plants — has become a natural draw for some of Houston's wildlife, including seagulls and the occasional egret. Zeno is proud that he had a hand in making it happen.

"I want to help give back to the environment," said Zeno, a senior, as he surveyed the habitat with other students who helped design and build it. "I appreciate the wildlife, and the wildlife will appreciate me."

The Yates Texas Wildscape Backyard Wildlife Habitat, as a sign proclaims at the entryway, represents a growing interest in

teaching city students about the value of providing a natural environment for wildlife threatened by expanding urban development.

Tony Church, who teaches construction trades at the school, started the project through a partnership with the Texas Department of Parks and Wildlife and with Natural Legacy, a Houston-based group dedicated to teaching youth about nature. He estimates that about 200 students worked on the project.

Church, whose classes built the deck, fence, benches and even the stone steps used in the project's design, was so taken with the idea that he plans to pursue a doctorate in environmental sciences.

"Everyone is looking for some natural environment now," he said. "I think we are tired of the concrete and steel, and we just

**See HABITAT on Page 38A.**



Photos by Carlos Antonio Rios / Chronicle

Ashlon Smith checks on wildflowers growing in the backyard wildlife habitat designed by students at Yates High School.

## Habitat

Continued from Page 29A.

want to have something that is more pleasing to the eye."

Yates is not the only school to boast a natural habitat, although they are more common at elementary and middle schools than at high schools. In the Houston school district, officials estimate at least 50 schools have some form of natural habitat, and the number is growing.

But the Yates project exemplifies how schools and homes with limited space can develop an environment that attracts a variety of birds and butterflies and even a few nocturnal animals such as raccoons and possums.

The wildscape, measuring 50-by-60 feet, occupies a corner of the school's courtyard next to a greenhouse, and students have been quick to learn its benefits. Some hope to build refuges in their own backyards. Its value, they say, is obvious.

"People get to see wildlife," said Ashlon Smith, a junior

who can name nearly all the plants and flowers growing in the habitat. "Mainly that's what everybody wants, is to bring wildlife to their home."

The idea behind the habitat is a real-life lesson in biology. The pond has fish, which eat mosquito larvae and attract birds. The plants produce nectar that attracts butterflies and hummingbirds.

In short, explains senior James Colbert, "it's like a big food chain."

To learn more about it, Colbert, Smith and Zeno took part in a six-week internship offered by Texas Parks and Wildlife last summer.



Yates teacher **Tony Church** helped his students build the deck, fence and steps in the refuge.

As part of the paid internship, the students developed teaching materials other schools can use to create their own wildscape. Zeno's specialty was development of the pond. Smith concentrated on native plants, and Colbert focused on the wildscape's construction.

The project at Yates was paid for with a grant from Texas Parks and Wildlife. Diana Foss, an urban biologist with the department, worked with the students and found that the more involved they got



Ashlon Smith, left, and Devron Zeno look for frogs in the pond of the wildlife habitat they

helped to create. It's also home to fish, plants, butterflies and seagulls.

in developing the habitat, the more inquisitive and enthusiastic they became.

"The ultimate goal," Foss said, "is that we want the students to feel a connection to the land, and we want them to be good stewards of the land in the future."

Debbie Rhodes, the executive director of Natural Legacy, said she hopes more schools will find a way to build habitats, because students in heavily urban areas have little opportunity to learn about the natural environment.

"A lot has to do with exposure," she said. "Increasingly, the more urbanized we get and the more land we develop with strip malls and acres of car lots, we are not providing any opportunity for them to be surrounded by nature, where they can understand how nature works."

Yates students need only walk outside to get a sense of what can be found in a natural environment. Science teachers say they use the habitat as a living laboratory. Students say they find it relaxing and peace-

ful, except at night, when the crickets and frogs come alive.

For the students who devoted long hours before, during and after school to develop the wildscape, the effort has been especially gratifying. Some of the teachers have asked them for help in designing a wildscape for their homes.

"I always appreciated wildlife," Smith said, "but I never knew how I could help other people appreciate it. Now I know."

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