

Today, Yesterday, and Tomorrow Wetlands: Observations for Stability and Changes

Lola McIntosh
T. H. Rogers School

Wetlands, Wetlands, Wetlands,
But where are they for us to see?
What are they so we can know
 how to find them,
 how to create them,
 how to fix them,
 how to preserve them.

~ Lola McIntosh

INTRODUCTION

Plants, animals, ponds, ditches, crawfish, ant hills, worms in mulberry trees, bugs, mice, squirrels, frogs, and birds have always been my friends, companions, and confidants. Growing up as an only child, these creatures and geographic structures filled the void of sisters and brothers in my life. I was always in the tree, by the pond, in the garden, or somewhere communing and interacting with nature. These friends and I were always together in their habitat or domain. I didn't really understand the importance of these creatures; I just knew they made my world warm, interesting, and complete.

All of these animals and geographic features are part of the wetlands scene in nature. They are biology and environmental science laboratories that provide functions to humanity that cannot be replaced with machines. These actual experiences in nature cannot be replaced with classroom instruction with a book. The hands-on experiences will stay with the students for a lifetime.

In accordance with the new focus on science laboratories, ponds, and natural habitats, my school, T. H. Rogers, has created two ponds, a forest habitat, and numerous vegetables, herbs, and native plants gardens. What exciting tools these are to use as I introduce and share my love for nature, especially wetlands, with my students!

Teaching is my lifelong passion, and the longer I teach, the more passionate I become about my students' making connections across the academic disciplines with life's experiences. Operation Ponds Watch (which will be the title for this unit of study) will allow me to share my love and passion for nature with children as we research and learn together.

Writing my own unit has given me opportunities to gather materials and adjust them to the ability levels of my students. Hands-on experiences and simulated activities give power to my third grade vanguard students' comprehension and application of skills in all subject areas. Having ponds in "our own back yard" will provide just the setting for us to study life, as it exists in the wetlands, and natural habitats of animals, microorganisms, and native plants. Writing and teaching this unit will provide real experiences with nature and an awareness of our environment and its benefits. The students will learn just how important these areas are and how endangered

they become as mankind ignores them. They will become acquainted with my “nature” friends just as I did as a child. Having these areas on our campus is an advantage, and when we visit other areas like this off-campus, the students will be familiar with and know what to look for. These off-campus field trips will provide excellent information to use for comparing and contrasting lessons.

OBJECTIVES

This unit will focus on the Texas Essential Elements of Knowledge and Skills, and Texas Assessment of Knowledge and Skills’ objectives, which are integrated into the Houston Independent School District’s CLEAR curriculum. Research from books, magazine articles, the Internet, field trips, and guest speakers will answer our questions and provide more questions for us to research, investigate and to answer.

The students will:

- *SCI.3.1.07C Construct simple graphs, tables, maps, and charts to organize, examine and evaluate information.*
- *SCI3.02B Collect information by observing and measuring*
- *SCI3.1.03A Plan and implement simple descriptive investigations including well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology.*

RATIONALE

The purpose of the students’ first year’s observations is to compile a basic field guide for future students to use for compare and contrast lessons and to begin the area’s historical compilation. Basic dimensions of the area, including the depths of the ponds will be documented. A section of the guide will contain mini lessons, lesson plans, observation notes, and a map of both pond areas. The project will pass to the next class of third grade students and will continue every year as we compile data about this fascinating part of our scientific studies habitat.

The lessons described here can be redesigned to challenge higher-grade levels. The students will apply skills acquired in Reading/Language Arts, Science, Mathematics, and Social Studies. As we begin our studies and gather resources, we will work with the librarian to start a reserved section in the library. This way, students and teachers will not monopolize resources for long periods of time, and everyone will have them to use. As we compile Internet research, printed copies of the websites’ information will be included as well.

Operation Ponds Watch I (the first year), will be introduced during the first week of school, and the observations and recordings of events will be ongoing throughout the year. The very first observation will be recorded in the students’ journals with diagrams and dialogue describing the students’ recordings. Discussions concerning the area will form the springboard to the students’ inspiration and will enhance their recordings. We will also keep a digital diary. As a challenge, we will include making a documentary from films made by the middle school students when they join us in the habitat.

Vocabulary lessons, mini lectures, writing and photography sessions, and classroom discussions will drive the unit to its completion. Guest speakers from different environmental and wildlife organizations will put the icing on the cake. We will begin the compiling of records and challenge students in years to come to compare and contrast with our data.

The concept for T. H. Rogers School was the brainchild of a former superintendent of the Houston Independent School District. Magnet schools attract students that are interested in a particular academic area of study. The magnet concept for T. H. Rogers was Vanguard and Handicapped under the same roof. The philosophy for this mixture was that the Vanguard

students would empathize and understand people who were not as academically fit as they were and find ways to communicate with and aid these students. Located in the Galleria area of Houston, Texas, the school boasts of this unique population. Included on one campus are the following programs: the Regional Day School for the Deaf, three-year-olds to eighth graders, Multiply Impaired, kindergarten through high school, and Vanguard (kindergarten through eighth grade).

My third grade vanguard students will become marine biologists, botanists, photographers, and ecologists as they learn more about nature through simulations, observations, and experiences. We will collect water samples from our ponds and examine the organisms that live in it with microscopes. Preparations of our own slides for the observations, study of the hydrophytes that live in and around the water, and research about the plants that live in the surrounding areas will make each lesson and activity more realistic. Soil samples will be taken periodically, observed, and studied. We will measure, document, and study some of the multiple aspects of the ecosystem, from soils to animals listed below. The science teacher works with the students also, using the objectives from the CLEAR curriculum mentioned earlier. He can expand the lessons to use measurements and investigations that require equipment that is not found in the regular classroom.

Soils: Water content, percent of organic materials, and pH.

Water: Depth, pH, and clarity.

Plants: Diversity, height, scientific names, species, biomass, flowering.

Animals: Diversity, species, reproduction.

The culmination of these studies will be a display of picture diaries of all of the students. Parents and visitors will be amazed to read the scientifically accurate compilations of such young students. It is my intent to write a grant which will allow us to buy a night vision camera which will observe while the young scientists are asleep in order to have accurate information about the wildlife that comes to our pond area at night.

UNIT BACKGROUND

The basic dictionary definition of a wetland is (n) lowland area such as a marsh or swamp that is soaked with wetness (*American College Dictionary*).

Ronald Rood, in his delightful children's book *Wetlands*, says, "No single book could ever tell the whole story of the wetlands. Each swamp or pool or marsh is different from any other. Beavers may make a new pond in a week by building a dam across a stream in a meadow. A flood can wash away a dam overnight while the rushing water makes a new pond somewhere else" (48).

The EPA website more specifically points out that wetlands "are areas where the water covers the soil, or is present, either at or near the surface of the soil all year or varying time periods during the year. The variation of wetlands is vast because of the differences in soils, topography, climate, hydrology, water chemistry, vegetation, and regional locations. There are two recognized categories, coastal or tidal, and inland or non-tidal" (EPA).

In the United States, the coastal wetlands are found along the Atlantic, Pacific, Alaskan, and Gulf coasts. These wetlands are linked to our nations' estuaries where seawater mixes with fresh water (EPA). Our local wetlands on the Texas Gulf Coast are abundant and diverse (Texas Coastal Wetlands 1).

Wetlands can be seasonal. Even wetlands that appear dry at certain times often provide critical habitats for wildlife adapted to breeding exclusively in these areas (EPA).

Students need to know that there is no need to go to a special place to find wetlands. They are all around us. They can be in a swampy area, a slow-moving stream, a soggy abandoned lot, or on the school campus and their own back yards – anywhere there is standing water for a period of time. In the Houston area, temporary freshwater wetlands and drainage-ditch wetlands are a very common feature of the landscape.

Swamps, streams, and marshy places may seem to be places of no activity or interest to kids. These areas appear to be only water and weeds on the surface, but at the edge of the water area, there are many obscurities revealed. “Some of these squelchy delightful creatures and botanical mysteries, are plants that move, and creatures that walk on water, breathe by means of snorkels, or send their jaws out for lunch” (Rood 8-9).

These natural areas help us by acting as sponges by trapping rain and snow, which in turn is an aid to flood prevention. Wetlands help prevent erosion along the shores of oceans, lakes, and rivers. In addition, they filter the water as it flows from higher places to open water (EPA).

Some experts view wetlands as biological supermarkets, providing food that attracts many animal species. They are a necessary part of man’s environment. Some plants and animals use them during part or all of their life cycles. The enriched dead and decomposed matter of these organisms breaks down to form “detritus,” a small enriched material that feeds small aquatic insects (EPA).

These places are also used as places to raise their young. When wetland dependent species of birds start to decline in numbers, it is often the loss of this kind of wetland habitat that is the cause (EPA).

In addition to supporting the food chain of the plants and animals that live in the wetland and providing these organisms with necessary water and shelter, wetlands are also important parts of the global cycles of water, nitrogen, and sulfur. Scientists are beginning to realize that atmospheric maintenance may be an important wetlands function. Wetlands store carbon within their plant communities and soil instead of releasing it to the atmosphere as carbon dioxide. Wetlands help to moderate global climate conditions (EPA).

The biggest threat to our wetlands is mankind. The development of suburbia has caused great losses of freshwater, and on our gulf coast, land subsidence. If our wetlands disappear, our water will not be as clean, fish and bird populations will suffer, and the severity of floods will increase.

Involving the students in this study will make them environmentally aware of natural habitats and the importance of these habitats to the future politicians, engineers, botanists, biologists, and good citizens that populate my classroom, today, and tomorrow!

The following activities are good examples of inclusion lessons across grade levels, and ability groups. My third grade vanguard class is partnered with two multiply-leveled deaf classes; however, our multiply impaired partner class has not been assigned yet. Middle school students are assigned to various classes in or school in order to begin working on “service point” hours they need to complete qualifications for graduation from high school. All activities will include our deaf partner classes when possible. An interpreter and the teacher will be included so that the deaf students will be able to understand and apply all the activities. Middle school students will join us for added supervision and to film the sessions. On days when we have lab with the science lab teacher, he will accompany us. Sometimes we may be fortunate enough to include parents who want to volunteer.

LESSON PLANS

Lesson One

Objective: To assemble a research library for study and guidance. We will brainstorm to decide what kinds of books we want, such as books on urban habitats, pond construction, native plants and grasses, wetland ecology, migratory corridors for birds in our area, insects, animals, and microorganisms, and the various kinds of published field guides. We will work with the librarian to designate a separate part of the library for books to be placed on reserve and for Internet research. At the end of this year's study, we will add resources that we have written. We will also critically evaluate the Internet research to identify sources we can trust and to determine whether the articles are opinionated comments or fact-based information.

Materials:

summarization ring
pencil

Activities

The students will go to the library and break into groups of four. They will peruse the library's computers and shelves for books and periodicals that give them information about wetlands and habitats. They will include geographical dictionaries and books on maps so that they can find areas around Houston, and surrounding areas, and other cities, states, and countries where wetlands are located.

At the end of the session, they will share the materials they have assembled, shelve them, and design check-out sheets and procedures.

We will go back to the classroom, fill out our KWL chart, and write summarizations of the activity for our summarization rings. (The summarization ring is an index card with a hole punched in its side and hooked onto a binder ring.)

As the years pass, the final activity for the year will be to go through and update our research on wetlands. We will add books that we have collected or ordered from school book clubs. Our new field guides for that year will be added.

Lesson Two

Objective: The purpose of this lesson is to introduce the unit and the first field activity. We will begin our session with brainstorming for a KWL (Know, Want to Know, What we Learned) chart. This chart will be the skeleton for all field lessons, lectures, and guest speaker sessions.

TEKS/TAKS Correlations (These objectives are required to be taught and mastered by third grade students in the Houston Independent School District)

SCI3.1.01A Demonstrate safe practices during classroom and field investigations.

Before any field or lab lesson, participants will review the basic safety rules when working with any type of scientific investigation.

The rules are:

1. Never, ever go to the pond without a responsible adult accompanying you.
2. Stay with your lab group leader and group at all times.
3. Running and horseplay are not acceptable.
4. Keep your safety goggles on at all times.
5. When removing samples from the pond, make sure to choose a sturdy, dry place to stand.

6. Return all materials to the delegated tool shed when you have completed gathering specimens.

Materials

Chart Paper
Markers
Pencils
Student journals
Digital Camera
Bug net
Goggles
Magnifying Glasses
Summary Rings

Activities

The teacher will open the discussion by asking the students for a definition of habitats. She will record their responses on the chart under the KNOW column. The next question will ask the students what they have observed around our school ponds, butterfly gardens, and other natural habitats on the campus. After recording the KNOW responses, the teacher will ask the students what they want to know and record these responses under the WANT TO KNOW column. After the brainstorming and recording session (approximately 15 minutes), the students will accompany the teachers and interpreters to the ponds' sites.

At least three forty-five minute class sessions will be needed for all groups to complete all of the tasks.

The students will be divided into groups of four and assigned specific tasks. One group will sketch what they see and record journal entries explaining their drawings. One will take digital photographs, one will sweep for and collect bug specimens, and one will collect water samples. Our samples will be brought back to the classroom and placed into the classroom aquarium for continuous observation. Supervision around the ponds will be crucial for student safety.

“Aquariums provide an excellent place to study the habitats and the histories of both plants and animals the students bring back from their field investigations. Specimens may be kept for a long time if the aquarium is “balanced” in food, plants and animals” (Reid 29).

There are several resources listed in the supplemental resources section of this unit, which give specific instructions on setting up the aquarium and labeling the specimens. The labeling can be done the next day, but the specimens should be placed in the aquarium immediately.

The aquarium(s) should be set up before the pond trips are scheduled.

Each task will be allocated twenty minutes. During the first day's forty-five minute session, the students will switch tasks after fifteen minutes. After the tasks are complete for this session, we will come together for the culmination of the lesson. Culmination will include discussions of what we have collected and observed. We will also review our sketches and journal entries. When the deaf classes are included, we will learn some of the signs for the observations we complete during that class session.

As the years progress, and the developments and transformations around and in the ponds continue and the data accumulates, this lesson should be modified according to specific assigned tasks. Each first time these activities are assigned after the first year of the habitats' and ponds' development, data from the prior year should be studied for comparison, new additions, and changes in the original structure. With this recorded information, the students should look for the expansion of the vegetation, and the increase or decrease in animal and microorganisms. These

facts will immediately turn this lesson into a science project for young biologists. They can form their hypothesis and predict the outcome for future investigations.

Bird watching can be integrated into the field observation lessons as the year progresses. The idea is to start out with small observations and increase with the comfort zone and maturity of the students.

Assessment: We will come back into the classroom and summarize the lesson by summarizing it on our Summarization Rings. (Summarization rings are 4X6 index cards on binder rings). After the first year, students will still summarize the lessons, but they will also type the new information and place it, along with recent sketches of changes, in our field guide that will be updated with new information each year.

Lesson Three: Pond Activities “After the Rain”

Measurements of the ponds should be taken each time the students go out to observe. This lesson will show a difference in water levels and give the students data for comparison.

Objective: The purpose of this lesson is to measure the depths of the ponds and compare them (after it has rained with the depths measured on prior visits). The students will take water samples from both ponds to observe in the laboratory later.

SCI.13.03A Collect information by observing and measuring.

Materials:

yard and meter sticks
student journals
pencils
summary rings

There are two ponds on our campus. We have labeled them the Green Pond and the Brown Pond. The rationale for these names is that one is always filled with leaves from the oak tree giving it a brown color, and the other is on the other side of the sidewalk away from any trees and has a green color. We will measure the depths in feet and meters and take water samples. The water samples will be observed the following day in the laboratory.

The students will divide into two groups, one at each pond. They will measure and record the depth of their pond, then switch ponds and measure the other one.

Afterwards, the pond areas will be sketched, and students will write their observations of what is the same or different about the pond from the last time. We will return to the classroom and record our discussion on the KWL chart. KWL charts will be laminated and kept from year to year. The students will compare the new information with the old. At the beginning of the second year, and each year thereafter, two more columns – What I Learned and What I Still Need to Know – can be added. This information will add enthusiasm to the lessons, and since the students stay in the same school until eighth grade, they can read about the thoughts, data, and discussion of students in other third grade classes. Another interesting activity to add would be for them to interview former third grade scholars of Operation Ponds Watch.

Assessment: The students will summarize the lesson on their index cards and add this card to their summarization rings.

Lesson Four: Expressing Observations

Objective: The students will begin to create comic strips showing their adventures during class sessions in Wetlands Territory.

ELA.W.3.O8.B. Record information in a systematic manner such as by drawing pictures.

Materials:

White ditto paper
Crayons or map pencils
Pencils
Internet
Wetland resources
Comic strip samples from the daily, and Sunday newspapers

The class will begin by perusing the KWL charts for information they have gathered. We will brainstorm for ideas and plots for our own comic strips. At the end of the discussion, students will assemble in groups of four and begin to create their own comic strips. They will use peer editing as they complete their rough drafts.

Assessment: The students will design their own rubrics for assessment of their work. The rubric must contain creativity, grammatical assessments, presentation expectations, and length specifications.

All lesson plans used by teachers contain some of the same ideas and activities, because that is what we do, plan, research, and write lessons and activities. We also search Internet sites, curriculum guides, trade books, and anything we can get our hands on for fresh ideas, or new spins on old tried and true activities. Of course, we never stop interviewing each other informally; it is just the way of those involved our world of education. The reader should use his/her own creativity in planning lessons for their own classes, and as they peruse the books and websites listed, other sources should be discovered, and can be added.

Completing this unit will allow students to not only strengthen basic scientific skills but also improve critical reading and writing skills as they record their findings in the scientific journals.

ANNOTATED BIBLIOGRAPHY

Works Cited

- Jacob, John S., Daniel W. Moulton, and Ricardo A. López. "Introduction to Coastal Wetlands." *Texas Coastal Wetlands*. <<http://www.texaswetlands.org/introduction.htm>>. Texas wetlands are highlighted which gives a broader view of the areas in our city and state.
- Reid, George K., et al. *Pond Life Revised and Updated*. New York: St. Martin's Press, 2001. This book is another informative collection of lessons and facts for the teacher.
- Rood, Ronald, and Marlene Hill Donnelly. *Wetlands*. New York: Harper Collins, 1994. 8-9. This colorful book contains a wealth of activities to adapt to your students' levels. You can pick and choose to your heart's content.
- Texas Parks and Wildlife, Galveston Bay Estuary Pro, and Sea Grant Texas. "Texas Coastal Wetlands." 27 Jan. 2003. 6 Mar. 2007. Specific facts about wetlands in our area. A good source for local facts and information when planning lessons.
- U.S. Environmental Protection Agency. *Wetlands*. 14 Feb 2007, <<http://www.epa.gov/owow/wetlands/awm/>>. Fact-supported information about wetlands is shared with the general public here. This is one of the Internet resources that can be included when the factual from opinionated information is sorted.
- "Wetlands." *The American College Dictionary*. Third ed. Boston: Houghton Mifflin, 2003. The dictionary is always our best friend when we encounter words we do not understand.

Supplemental Sources

- Batzler, Darold P., and Rebecca R. Sharitz. *Ecology of Freshwater and Estuarine Wetlands*. Berkley: University of California P, 2006. 1-402. This college textbook gives professional information for the teacher to be aware of the technical terminology the students should become familiar with as they progress through the unit.

Catlin, Stephen. *Wonders of Swamps and Marshes*. Mahwah, NJ: Troll Associates, 1990.

This little book of wonder gives specific instructions on labeling, and setting up the classroom aquarium for housing collected specimens.

Council for Environmental. *Aquatic Project Wild*. 5th ed. Washington, D. C.: American Forest Foundation, 1997. 252-280.

Workshops are provided by this agency for the teacher, providing hands on experiences to familiarize him/her with lessons and experiences for the students. The book is given to participants in the workshops.

Garza, Shellie, et al. *School Habitat Guidebook*. Houston, TX: Environmental Institute of Houston, 2004. 44-57.

Facts and information about the care and maintenance of the campus habitats in Houston. This is a must read.

Project Learning Tree Environmental Education Pre K-8 Activity Guide. 5th ed. Washington D. C.: American Forest Foundation, 1997.

Activities can be used for any grade level from this publication.

Web Sites

Cheek, Jerrie S. *Wetlands*. 12 Feb. 2007. <<http://edtech.kennesaw.edu/web/wetlands.html>>.

This website gives definitions and descriptions of the types of wetlands and the insects, animals, plant life and microorganisms that inhabit them.

Enchanted Learning. <members.enchantedlearning.com/dictionarysubjects/works.shtml>.

This website has activities for reading, writing and comprehension. Sketches of animals and organisms are available for labeling. A fee is charged for using this website.

<<http://www.edhelper.blog.com/cgi-bin/logon.cgi>>. 5 Feb. 2007

Comments about wetlands, and activities from which to modify, pick, and choose are found here. A membership fee is required to use this site.