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Are You Balanced With Your Environment?

Curriculum Unit 99.06.07
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(Dedicated to my grandchildren, Eme, Benjamin, Celeste and Dominique and to my Principal, Patricia DeRenzo.)

RATIONALE

It is of vital importance that students of Elementary Schools, starting in kindergarten, be introduced to the topic of the environmental balance and to inform them and their families what could happen to the Earth if we don't make the effort to provide and create the potential for future changes like clean drinking water or conserve the pristine environment like forests and lands, and conserve and recycle resources. We may yet leave for our children a world community that takes several steps and challenges to secure our common future.

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Part I

Introduction:

Have you ever heard the expression "Balance of Nature?" What does it mean? In nature, Balance is a process or a happening. It is a combination of many things. It is everything that happens to keep the number of individuals of species constant. Balance is the key for the survival of living things in their environment. If this balance if upset for even one species, many things can happen. Much of what happens can be harmful to other living things in the Environment.

People in Science:

Rachel Carson (1907-1964) was a Wildlife Biologist who wrote a book: Silent Spring. In this book she made people realize the harm being done to living things by chemical poison in insect sprays. She made people aware that these poisons had found their way into the plants and animals that people were eating. As a result of her book, much more care is now being shown in the use of chemical insect killer. Insecticides can have harmful effects on birds, plants, animals, and humans. If bird are harmed, they will be unable to scatter seeds or to kill harmful insects. Plants and animals affected by these poisons can cause sickness in humans who eat them.

The Role of People:

What can people do to restore the balance of nature? Do we have a program of conservation we could practice with the students and our community? One of the main objectives of this unit is to increase our knowledge about how much people play an important role in conservation of organisms and their habitats.

According to the Okanagan people of the Pacific Northwest, and the Abenaki, the Sioux and the Anishinabe, we have a role on this Earth, a mission: "To maintain the natural balance, to take care of our Mother, to be keepers of the Earth".

The Teacher's Role:

This curriculum unit has been developed for kindergarten to fourth grade students. Goals and objectives have been adapted according to the needs of the children, under the expectation that older students will be able to absorb and comprehend more complex material, and to accomplish this ultimate goal: Connecting learning to the child's individual world. Science Literacy will be required with an emphasis on the critical thinking skills. But, how? I asked, How can I effectively teach this unit? How can I see the goals and objectives for today's school children? Fortunately children already possess the most important attributes a scientist needs: natural curiosity and wonder about the world around them. I decided then, to guide the students in a program that may develop their innate curiosity with very simple activities described in a separated section. Integrating several mini-themes related to specific areas of the Curriculum using the web method or a map allowing the freedom to teach in a flexible way that may let the children learn at their own pace and in their own style. They could work as a whole class, individually, or in cooperative groups. And even more important, we all could have Fun while doing it.

Part II

Unit Topic:

My unit will be teaching students that the environment is all about balance, and requires an awareness of cumulative problems in the use and misuse of Earth's resources such as water, air, trees and plants, animal life, soil and minerals.

A comprehensive program integrating district wide goals of literacy, using all the areas of the curriculum will capture the students and will provide teachers with a different tool they might need to grab the attention to this particular program. With the design of this unit of study about the Balance in Nature I will be able to help children make sound and responsible choices to keep the world safe for all creatures. We all must

become acutely conscious of the way we live.

What will happen to the Earth? Can we and our students restore the balance of nature?

Nature Educator Joseph Cornell has written books and conducted outdoor classes to help adults and children to appreciate nature together. He says, "To teach children sensitive respect for the environment, we need to help them develop feelings for nature that are rooted in the higher realities of the heart." (Creative Classroom, Caring for Our Earth, March, April. 1997.)

My primary goal in this unit I wish to teach to Elementary students is to open children's minds to the wide range of environmental issues, about pollution, animals, water pollution, waste management, and share them with the class. Ideally the students will gain a greater understanding and appreciation of the world around them.

What Can Kids Do?

Statistics: Sharing statistics with the students can be one way to inspire action. It is often useful to have students collect their own statistics and then to analyze them. For example-How many trucks pass by school in an hour? How much pollution came out of the trucks? Or, how many pounds of toxic chemicals are released to New Haven's air each year? How many days each year does New Haven's air exceed the allowable level for various air contaminants? Is the time of year predictable? Is it related to weather conditions? (For Grades 4 to 6, ages 11 to 13).

Organizations: To be in touch with organizations is another way to orient children in caring about the environment. Student could search the web (in a supervised way) to identify key organizations of children or schools that are attempting to improve environmental quality. City Year members of Boston, Massachusetts, is a good example (For Grades 3 to 4, ages 9 to 11).

Attitudes: As a teacher I will impart environmental ethics that will help children see themselves not as thoughtless conquerors but as citizens and protectors of the land. What are the dominant attitudes that children have toward nature? The students could design a survey and administer it to other students to find this out (For grade 3 and up, ages 9 and up).

Strategies: I will need to develop several strategies. One of them may be investigating positive personal choices like, water-and energy conservation, and recycling. (Activities will follow under the Lesson Plan Section.) Other strategies I might use will be according to their level and interest. We also have to learn from direct experiences and talk later. What we learn from these experiences are far more valuable than lectures, cultivating a sense of joy. The way I will show enthusiasm in this vast theme will be my greatest asset as a teacher and will surely give the children the sensitive respect for the environment and decide if they want to chose the will and the ability to protect, defend, preserve or destroy other living things and our planet itself. The challenge is to become personally committed to maintain the natural balance of the environment.

Who Will Save the Earth?

When I decided to write this Unit and started to obtain information about our environment I was overwhelmed with the tremendous amount of data I found. But, do we have real basic facts in order to be adequately equipped to save the Earth? Are we absolutely conscious about what is really happening around us? Aren't we just following the "sound of the pipe" and going directly, massively to the abyss, and not

listening and stop and think what could we do as teachers to prevent more danger around us? We already are dealing with violence, drugs, alcoholism, poverty, dysfunctional families, poor health, climate changes, enigmatic patterns of earthquakes and volcanoes. Aren't they all puzzles pieces we have to put together and try to see the whole problem and not in isolation? What does Earth mean to us? I think that we never have been able to formulate this question in deep. We know that we were born in a place, that we live in a place, that we die in a place, and that we struggle hard to avoid misfortune, unhappiness, but I m sure that we never have been thinking enough in our common mother: The Earth. How do we treat the Earth who gives us a time to live and to develop a sense of humanity? We are trapped in a so named "civilization" where everything is fiction, fantasy. We do not look around and what is really happening to us. Are we prepared to return the balance of our nature? We lost our sense of what is the best for our children. We teach carefully and methodically Math, Literature, Science (living and not living things), Social Studies (how the Earth was formed, how many countries, names of Continents, Oceans, etc.). A little track of History and names of important people who gave this nation a name, and here we stand hopelessly trying to teach to our precious future, "our stewards of this world", the importance of taking care of our common mother, The Earth, who is giving us a moment to live, a moment to share, a moment to love, a moment to care, and we close our eyes. We do not want to listen to the clamor: Our Earth is in danger to disappear. Yes! That is the tragedy! It is not a fiction, a novel or a commercial on TV. It is the reality, and it gives me the opportunity to develop in my students the initiative and self-motivation as well as a basic knowledge about how could we preserve our Earth, our Planet, and find some way to work it out together, including the community. Only then, I will be able to feel that I have done my job as a teacher, sharing knowledge, reading books and trying to balance nature with activities I will prepare for each grade in this Unit, in a separate section. We must have the tenacity and courage to examine the various disease processes afflicting our planetary home. (1)

The Critical Background.

Millennium after millennium our Earth has been covered by debris, snow on ice caps, mud on continents, tiny seashells on ocean floors and flows of lava everywhere. Since the 1960's scientists have drilled cores into these layers to read evidence of changes in climate and sea level, evolution and extensions of living things, the turbulent birth and death of tectonic plates, and the age of continents. Like a living thing, Earth is in constant motion. What will happen to the Earth if we don't know how to take care of nature. Nature is part of all of us. We are nature. We are damaging our heritage. Every year in April, we celebrate Earth Day, an annual event that energizes the environmental movement around the world nearly three decades ago. Did you realize that some of the simple steps you take today in your home and in our classroom may hopefully help solve some of the world's energy and environmental problems? Alone, it can't be done, but our combines effort can make a big difference.

I remember a time when Earth Day was considered slightly kooky and offbeat but my own children were not even thirteen years old when they started to talk about taking care of nature, and the environment was a matter of special concern. My oldest daughter decided to separate garbage and to make a hole in our backyard where we could throw disposable natural products, and to separate bottles, paper and plastic in special containers. My youngest daughter came one day from her yoga classes talking about how dangerous it was to eat and touch food from other's plate, and that some deodorants and shampoos were not safe in a long term, that the water we were drinking was polluted. My first reaction was thinking about the "strange" ideas they had, but I always tried to respect and support my daughters opinions, and then, as a flashback I remembered my own grandmother's concern about contaminated water and food, and how much she cared for the wonder of nature. We have been aware about nature from the beginning of the so named "civilization". Let's only go back to the Native Americans who were, as we know, very spiritual and lived close to nature, and

celebrated three major ceremonies, like a Planting ceremony, a Harvest ceremony, and a Green Corn ceremony. Until the time of the green corn ceremony it was considered a crime against the gods to eat or to touch the corn. (2)

Going back to the past we can find sizable information concerning the culture and love of trees. Trees were considered as part of nature and the beauty and mysterious chain of life. As an example, the apple tree is often found in the Greek myths. One of these myths relates us the story of Mother Earth, Rhea, who gives the golden apple tree of eternal life to Hera when she marries Zeus. The tree is planted by Hera on an island of paradise at the edge of the world and is protected by Atla's daughters, the Hesperides, and a dragon who never sleeps. They protected this symbol of life-everlasting and only allowed the gods to have access to its fruits. In this story as in many others, the tree represents the passage of time and care of nature.

Another tale relates the story of Pomona, the Goddess of the Art and Science of fruit culture. She is said to have been so involved with the care of her orchards that she never noticed her admirers. Vertumnus the God of the changing seasons, was the suitor who finally won her affection and married her. Together they were the guardians of the fruit trees.

In the Old Welsh tales, Avalon ("Aval" meaning apple") is described as a place of eternal happiness where there is no age, sickness, or death. The isle is ruled by the Celtic goddess of death Morgan La Fay and the three ladies who ruled the Earth, the Sea and the Underworld.

Trees have been always delightful symbols of the coming of new life. They are powerful examples of tenacity and the ability to withstand wind, rain, cold and heat and all that may be encountered on the cyclical journey of seasonal life. (3) Trees are the lung of the Earth. Over the last twenty years, the government has encouraged aggressive deforestation and the land degradation. As we see, in terms of the biology of the planet, development is a euphemism for destruction. In a world where all resources could diminish and extinct like forests, soil, air, minerals, and water-the continued use and abuse of them can have only one end: the depletion and destruction of most life. When a forest is destroyed and took thousand of years to evolve into a very complex biodiversity, it takes hundred of years to regenerate (4). Trees are therefore an organic necessity to our planet. We need to plant trees, (this is one of the activities I prepared for my students) not to destroy them in name of "development".

Planting Tomorrow's Trees.

This topic is one of my culminating activity for all grades. We need to increase five-fold the number of fuelwood trees planted per year. More people everywhere want more wood, and a large amount of wood is used for paper, also for luxury purposes such as decorative paneling, furniture, and houses. We know that a forest plays a role in the planetary recycling of Carbon, Nitrogen, and Oxygen. They constitute the major gene reservoirs of our planet, but we don't know is if the larger trees have been cut, the smaller ones will stop growing; they will never reach their full height (5). "Rain Forest" has become quite the buzzword up for everywhere. But stop one of my students and ask him/her why we should care about it, and she/he might mumble something about global warming. It's true but it is still only part of an even larger problem, they do the function of the Earth's lungs regulating planetary climate by absorbing huge amounts of deadly Carbon Dioxide. The Rain Forests are also home for 300,000 species of plants some of which are used for pharmaceutical drugs. Gordon Cragg, Chief of Natural Products for the National Cancer Institute (NCL) says: "Nature produces chemicals that no chemist would ever dream of at the Lab Bench.

Poison Problems.

Students need to know that we are surrounded by natural poisons but that they exist to protect plants and animals, and that there are also other kind of poison. Those which people produce and discard into nature producing harm to the environment.

We as teacher have to educate children about why people produced chemicals discarded to the environment are harmful to all living things. Urban areas are after the rural ones one of the largest affected by poisons, not only agricultural areas. A huge amount of pesticides are used by urban homeowners; with the use of them on lawns, trees and gardens, also inside their homes when using pesticides to control insects.

These hazardous chemicals have been examined by subcommittees around thirty years ago, and specially after the publication of Silent Spring in 1962 (by Rachel Carson) about the use of pesticides in America containing Dioxin, (TCDD) one of the deadliest manmade chemicals known. They found that this chemical product when used affects a whole chain contaminating water-food-animals-plants and people. So, in some way, as Lewis G. Regenstein wrote in his book, Cleaning Up America the Poisoned: "Pesticides are poisoning the people instead of the insects." According to laboratory experiments the use of pesticides in our garden and house has frequently been demonstrated as a powerful poison. People exposed, especially children can develop Leukemia and other disorders.

What Can We Do.

Instead of spraying pesticides and herbicides over farms, forests, the government could hire people to remove weeds, undesirable trees and other unwanted vegetation by hand. It provides employment and in a long term, saves the ecosystem (all creatures). Inside homes we are exposing ourselves to toxic substances but specially our children, and in other buildings too, like schools-theaters, churches, when using pesticides or other toxic substances for cleaning. The principal ingredients we consume for cleaning are chlorinated compounds known as a danger of there own. It has been studied that these products produce hormone disruptions and are potentially harmful.

What Can We Do.

Reading and following the label of the cleaning products would not eliminate the risks to us or our children but it will reduce them. Using pesticides only if it is absolutely necessary and following the label instructions very carefully. Also many inert ingredients are not listed. The law does not require it. So in some way we will not be able to know the exact harm that will affect us. Cleaning the house often with water-mops and vacuum cleaner will reduce the exposure of toxic ingredients.

Researching Recycling.

Recycling means thinking ahead. Before you buy or use something, you think about the environment. Recycling happens after you have used something once. Then you try to use it again. What kind of trash do we toss out? Paper, plastic, glass, metal, food and yard waste, clothing, batteries. Today in America, someone you know will throw out four to six pounds of garbage. In one year, our nation trashes 70 million tons of packaging-from plastic toys to glass bottles. Where does this garbage go? We know that big trucks come once a week and toss the garbage we put in trash cans into the garbage truck and then they take it to a dump or in other cases some barges take it far away. But the dumps are almost full. We also throw lots of garbage on the streets: empty cans-bottles, etc. With these habits the natural balance is already drastically altered. The list of facts below (from the Green Bay, Wisconsin Science Museum) illustrates the length of time necessary for everyday objects to decompose in our landfill.

Tin Can		100 years
Glass Bottle		Thousands of years
Apple Core		4 weeks
Cantaloupe Peel	4 weeks	
Aluminum Can	200 to 500 years	
Soda Bottle Cap	400 years	
Styrofoam Cup	Thousands of years	
Paper Napkin		4 weeks

People throw always much too much. Here are some examples found about how much trash is throwing away.

In one year, people in the United States throw away enough trash to fill a bumper-to bumper line of garbage trucks reaching halfway to the moon. (6)

In just two weeks, people in the US. will throw away enough glass bottles and jars to fill up the twin towers of the World Trade Center. (7)

The United States throws away more than twenty-five billion Styrofoam cups each year. If all these cups were placed end to end, they would circle around the Earth 436 times. (8)

If just one state in the United States recycled all its cans for one day, there would be enough aluminum to build more than fifteen jet airplanes. (9)

Clean Up Connection or What We Can Do.

Note: (The State of Connecticut has a mandatory Recycling Act.) Exactly how does cleaning up the environment help our Earth? Recycling is good for all of us. It would help to balance the environment. We need to recycle garbage from schools and homes. The landfill is not big enough to hold all the garbage we make. There may not be enough room to make new landfills, so we need to teach everyone about recycling and do it. Other ways to stop the waste is calling the City Government and remind them that some people do not recycle, suggesting if the workers at the landfill would recycle everything that is recyclable. Then there will be more space in the landfill, and it will last longer. Other suggestion could be to ask about building fences around the landfill, to confine paper and plastics that would blow away. Promptly convering daily deposits also minimizes odors and protects landfills from scavenging animals.

PART III

CONCEPTS

Developing Science Process Skills.

Science process skills are the thinking abilities that relate to scientific investigations. They include

observing, classifying, comparing, contrasting, predicting, and more. Leading the students through these important skills will make them "think like scientists".

How Will I Do This?

Using children's natural curiosity about their environment, reading along with me, creating charts model ways of presenting information through graphic organizers investigating and experimenting with appropriate tools and equipment. Rocks, plants, insects, birds, clouds-even the moon and stars-all could become the basis for hands-on scientific investigations, both at home and in the classroom.

Fast Concepts About Ecology And A Balanced Environment.

Ecology means the relationship of organisms to each other and to their environment. The word ecology is derived from the Greek, Oikos, meaning household, and in this instance, the household is the whole Earth. Interrelationships are central to an understanding of ecology. These interrelationships are as follow: A tree falls in the forest, and all the species who used to live in, on and under the tree will loose and probably change forever the life of the species that had been growing underneath it. Older children can comprehend the concepts of Ecology, but it is generally difficult, if not impossible, for elementary school children. However, concrete examples, such as the one mentioned, could build a basis for a child's abstract reasoning and better understanding of the concepts. (10)

1) For children a Balanced Environment requires an understanding of Ecology or the relationship of living and not living things and their environment.
2) It requires an awareness of cumulative problems in the use and misuse of Earth's resources such as water, air, trees and plants, animal life, soil and minerals.
3) A Balanced Environment means putting a stop to Air Pollution, reducing garbage, protecting plants and animals.

Sources Of Air Pollution

Air Pollution: The atmosphere contains a number of pollutants. Some of these are produced by natural events such as the eruptions of volcanoes, wind-produced dust storms, and the decay of radioactive substances in rocks. The major source of air pollutants, however, is human activity. The burning of coal and wood caused pollution in London as long ago as the 1200's. Today the combustion of fuels in vehicles, factories, and power plants is the major contributor to air pollution. The evaporation of volatile compounds in solvents, paints, and oils adds to the pollutants found in the air. Various mining, manufacturing, and processing activities produce particulate matter that becomes part of the air. The important consideration is not only the amount of pollutants in the air, but also the specific kind. The pollutants most dangerous to health are sulfur dioxide, nitrogen oxides, volatile organic compounds, and particulates. (11)

4) Balanced Environment means: Reducing Garbage. This includes both recycling and recycling the materials we use. The world is running out of places to dispose or refuse. The solution is to reduce trash at its source. Studies have shown that up to 86 % of household waste could be recycled. Products that could be recycled include aluminum cans, glass, paper, cardboard, and metals such as brass, copper and lead.

Aluminum: Aluminum is one of the easiest materials to recycle. Used aluminum can be recycled and made into new aluminum. There are recycling centers that pay money for collecting aluminum cans, foil and others. The aluminum can be used over and over again. This material is very light but strong. Industries use it to make baseball bats, airplanes, cars and other things that need to be strong aluminum.

Plastic: Plastic is used practically for everything. Most of the food we eat comes in some type of plastic. If we don't put plastic in the right place, it could be dangerous for living things like seabirds, turtles and seals. They could get caught in plastic bags and soda rings and hurt and kill them. Plastic fills one third of our landfills,

and it take ten to twenty years to break apart in a landfill. Plastic containers can take almost 200 to 500 years. Anything made with plastic foam will never change.

Cardboard and Paper: We use cardboard and paper every day at school and a home. The paper industry depends heavily on recycling. More than half of all paper made in the U.S. is made from what once would have been considered "waste"-that is, recycled paper or residue from other wood product manufacturing processes.

Recycling Glass: Glass of the same color is fed into the plant on a conveyor belt. Caps and labels are removed by people, sometimes helped by magnets. The glass is crushed by a machine into small, smooth lumps and put into a furnace with other raw materials, including sand and limestone. The furnace melts them into molten glass, which is poured into molds for jars, bottles, or other glass items. Glass left lying around as litter can be an environmental hazard. Small mammals such as mice can squeeze into discarded bottles. They may be unable to get out and may die of starvation. Broken glass is a hazard to both animals and people's feet. Every year about 6,000 people need hospital treatment because of accidents involving broken glass. (12)

5) Balanced Environment means avoiding hazardous or toxic wastes, which contaminate food, water, and air and threaten the ecosystem on which we depend.

Toxic and Hazardous Wastes: Nuclear power as a source of electricity seems to be an ideal alternative, but presently it creates its own environmental hazards. The process of creating energy by atomic fission leaves behind dangerous waste products. The world is discovering that there is currently no safe way to dispose of this nuclear waste. We must make sure that water from the reactor is cooled before it is dumped into rivers and streams. Dumping heated water into waterways is a form of water pollution that kills fish and other aquatic life. (13) Nuclear energy is efficient but it produces dangerous radioactivity that last for thousands of years.

6). Balanced Environment means to protect trees. Trees help the air clean, are homes to birds and animals, provide fruits, nuts and oils and are used to make medicines. Trees are the giants of the plant world. They are the oldest living things on Earth and the most useful plants on the planet. Trees are essential to our civilization. Not just helpful or enjoyable or pleasant, but essential.

Forests help moderate the Earth's water cycle acting as huge sponges to absorb, store and slowly release the water essential to plants and animals. The forest is a complex community where trees and other plants and animals live in delicate balance. There are concerns about the forests future. One of the most serious problems threatening forest though, is deforestation, specially in the tropical rain forest. The rainforest around the Amazon River is the largest in the world. Many kinds of plants and animals live there. The rainforests that form a fertile ring around the equator do function like the "Earth's Lungs", regulating planetary climate by absorbing huge amounts of deadly carbon dioxide. And the vast destruction of the rainforest in this century, along with the rise in fossil fuel usage, is a major contributing factor in global warming. Every year, forty million acres of tropical rain forest are destroyed worldwide. That's an area larger than the state of California. (14)

GOALS

- o Thinking like a Scientist
- o To Preserve and Protect
- o Awareness of Ecological Principles and Basic Concepts on Environmental Science
- o To use Critical Thinking Skills
- o To initiate class participation in the study of environmental issues
- o To develop Science Process Skills
- o To foster scientific values
- o To encourage questions
- o To build science vocabulary
- o To praise curiosity and creativity
- o To sharpen observation skills
- o Demonstrate benefit of teamwork
- o Instruct on proper use of tools
- o Teach data recording skills
- o Place value on independent thought
- o Provide stimulating, hands-on activities and make Science Fun!!

LESSON PLANS

General Suggestions

INTRODUCTION: Caring About The Environment

More than five million species-trees, flowers, insects, fish, dogs, cats, and humans-share one home, Earth. All of these species comprise the variety of life that Earth supports, our biodiversity. Yet human beings are the one species that can decide the fate of so many others.

How? People have the will and the ability to protect, defend, preserve or destroy other living things. Can students make a difference while they are still young, so that the Earth they inherit is healthier because of them? Yes! And it is up to us to help children make sound and responsible choices. Protecting the environment is the key of this Curriculum Unit, and as a teacher and our students will explore five general goals in this unit; Awareness, Attitudes, Knowledge, Skills and Participation.

OBJECTIVE: How can we actively engage the students in learning about how to protect the environment?

Encouraging them to ask questions about nature and to seek answers, collect things, count and measure things, make qualitative observations, organize collections and observations, discuss findings, etc. (Benchmarks for Science Literacy-Project 2061.) "Hands on" Activities, while essential, are not enough. Students must have "Minds-on" experiences as well. They must show they can apply what they have learned.

LESSON PLAN I

TOPIC: Trees

Kindergarten Level

GOALS AND OBJECTIVES FOR THIS LESSON:

To learn about trees. Feeling, smelling, examining them and trying to understand why trees are so important for the environment.

BACKGROUND:

Trees are the giants of the plant world. They are the oldest living things on Earth-and one of the biggest! Trees are beautiful to look at, fun to climb, and the most useful plants on the planet. Trees are essential to our civilization. Not just helpful, or enjoyable or pleasant, but Essential.

ACTIVITY A

TREE TIME:

PROCEDURE:

Sit with your students under an oak or other native tree and watch how the tree's mood shifts with the changes in the light. Observe the tree from unusual angles. Encourage children to record their observations with drawings or photographs. Feel and smell the tree's bark and leaves. Examine the bark, soil and grass around the tree and see what you and your students can discover about the life-forms (plants, insects, and other animals) that live in and around the tree and depend on it for life and shelter.

Follow up with a visit to the library, local nature center, or even the town historian. Have your students prepare questions on what they want to learn about the tree. Have them share their findings with the class. (15)

ACTIVITY B

(For Kindergarten to First Grade)

MAKE AND MATCH BARK PATTERNS

Each kind of tree has a unique outer bark pattern, which peels and cracks as the tree grows.

PROCEDURE:

Take the children outside and show them these wonderful patterns. Then let them work in pairs to make bark rubbings of different trees. (Bark patterns can also be captured by firmly pressing modeling clay against the trunk.)

1) Have one child firmly hold paper against a tree while another rubs the paper with the side of a crayon. Then have them switch roles.
2) Point out that bark isn't all the same color. IT can range from silver to greenish brown. Also explain that the outer bark protects the tree from insects, animals, cold or dry weather, and even forest fires. Help children write the name of the tree on the back of their rubbing.

Back in class, mount the rubbing and challenge children to find patterns that match their own. Who can tell what kind of tree it is from the rubbing? Does anyone know what the tree is used for? (16)

EXTENDED LESSON:

TREE PICTURES: Drawings and painting of trees (see next page.)
MATERIALS: Paints, paintbrushes, crayons, pencils, paper, paper clips

PROCEDURE:

Paint a picture of a tree using just twelve brush strokes. Draw silhouettes of trees to show the typical shapes of the different kinds. Paint a picture to illustrate the concept that trees are nature's motels and restaurants. Cover a heavy paper with black crayoning. Straighten out a paper clip and scratch away the black to make a scene showing trees. Draw or paint different kinds of leaves as accurately as possible, do the same with tree flowers, fruits, seeds or nuts. Remember that drawing an item necessitates close observation.

LESSON PLAN II (Second and Third Grades) TOPIC: Recycling INTRODUCING THE TOPIC: Make a dramatic statement in support of recycling and help children better comprehend this concept in the following ways:

1) Have children put an apple core, a cantaloupe peel and a paper napkin in a plastic vegetable bag and bury it in the school grounds or in their own backyard. Periodically observe the decomposition process and verify the time factor cited in this list:

Tin Can	100 years
Glass Bottle	Thousands of years
Apple Core	4 weeks
Cantaloupe Peel	4 weeks
Aluminum Can	200 to 500 years
Soda Bottle Cap	400 years
Potato Chip Bag	100 years
Styrofoam Cup	Thousands of years
Paper Napkin	4 weeks

(From the Green Bay, Wisconsin Science Museum)

2) Create a poster titled "Did you Know?" that places the information from the list on a time line. Add other facts to the time line to give the children a point of references, such as their ages, and their grandparents ages.

ACTIVITIES

PROCEDURE:

Designate a rotating job called "The Environmentalist" for the first and second grade integrated. Stress that this is an important position that entails carrying an empty bag whenever the two classes go out to play or go to a field trip. The rest of the classes are to be responsible for picking up any garbage or trash they see

and giving it to the Environmentalist. Start a discussion about what is trash and what isn't. After several bags have been collected (they have to be deposited in a special garbage can), form a committee that will daily sort the contents of the bags into two piles; one for garbage and the other for things that can be recycled (like bottle caps that might be useful in carpentry, string to use in an art project, a can to be placed in a special aluminum recycling bin). As children sort the items, (using colorful rubber gloves) they will soon realize that their ideas about what to do with an object may differ, but all ideas need to be respected too!

After a couple of weeks, help the classes assemble different objects from the recycle pile. Use glue and large pieces of cardboard to create a collage of the recyclable items. Under each item, list one or two new uses of it. Display the collage in a central area for the entire school community to see. This is an effective visual way to create awareness of the innumerable recyclable objects.

EXTENSIONS:

a) Knowledge-What do you know about environment and recycling?
b) Comprehension-Retell to a partner what do you think about the recycling process. Then, draw a picture of the topic.
c) Applications-Investigate if other classrooms are recycling.
d) Analysis-Discuss how recycling can help the environment. What specific changes could happened if you continue to recycle?
e) Synthesis-Pretend that your class is on Environmental Team. Invent new methods of recycling for the future.
f) Evaluation-Write a paragraph explaining why is recycling important for the environment.

LESSON PLAN III

(For Grades 3 to 4 and up)
TOPIC: Organic Farming
BACKGROUND INFORMATION:

Organic farming is a method of planting fruits and vegetables without using synthetic fertilizer or pesticides. There is a controversy along these methods. Many food experts state that it would be environmentally desirable to grow crops on a large scale without pesticides, but they argue that pesticides are necessary in order to grow a large variety of foods at affordable prices. Many people believe that food grown without the toxic substances is more healthful. The issue of the best way to produce our food supply is complex, and there are many pros and cons.

Organic farming uses methods that are in harmony with nature. For example, organic farmers use compost to condition the soil and nourish the crops. Organic farmers also use natural forms of chemicals, such as nitrogen to fertilize their field. To control insect pests, they use insect traps, biodegradable sprays, or plant certain flowers as insect repellents. (17)

OBJECTIVES:

- Investigate organic farming techniques.
- Understand and demonstrate the process of planting a garden.
- Investigate how to make a compost heap.
- Infer how compost turns into a natural fertilizer.
- Describe how different kinds of plants grow.
- Observe different kinds of root growth.

VOCABULARY:

Compost:: Fertilizer made from dead plants, leaves and clean garbage.
Fertilizer: A substance added to soil to help plants grow.
Organic: Having to do with or coming from living things.

PROCEDURE:

a) If your class wants to start a garden with seeds from fruits and vegetables, make sure the seeds are prepped for planting. Watermelon and avocado seeds need to be completely dry out before planting. Other seeds like walnuts and pecans need to be soaked in water for several weeks and then left in a dark place to sprout.

b) Show students a current Farmer's Almanac and have them use the almanac as a model and a reference to compile a class almanac. They should include information about the weather, temperature, etc. Encourage students to jot down their thoughts about gardening as well as gardening tips they have discovered that might be useful to others.

c) Bring in an organically grown apple and one from the supermarket. Have students compare them. Tell your class that one of the apples was grown with the help of synthetically produced chemicals; the other was grown without them. Have your class sample the two apples for taste and texture. See if they can identify which is organically grown. (Explain that many stores bought apples look glossy because of a wax coating-they aren't naturally shiny. The organic apple may appear more pitted and rough.) Why would they buy an apple that was organically grown over one that wasn't?

d) Have your class write to your local USDA Soil Conservation Service to find out what kind of pesticides are used in your area. With your students compile a set of questions about pesticides use. Are these pesticides harmful to the environment? Do they hurt the wildlife in the area? Do the pesticides harm our water supply? What is being done to protect the area? Then write a member of a conservation organization to speak to the class concerning the issues.

e) Help students understand that some soil-dwelling creatures, such as earthworms, help keep plants healthy. Earthworms loosen the soil, allowing air and water to reach plant roots. Their tunneling also helps mix organic matter with nutrients in the soil.

f) To start student's own organic garden, they will need seeds but they don't need to go to a garden store to buy them. Just let them bring dried peas or beans from their kitchen cabinet at home and get growing.

MATERIALS:

2-3 dried peas
water
clear plastic cups
pencil
3/4 cup potting soil

DIRECTIONS:

1) Soak the peas in water for 24 hours before planting.
2) Fill the cup 3/4 full of potting soil.
3) Poke shallow holes in the soil with the pencil. Drop a pea in each hole. Place one seed between the soil and the inside wall of the cup. This will let your see the roots grow.
4) Cover the seeds with soil. Water the seeds enough to keep the soil moist.
5) When you see the seeds starting to sprout, draw a picture of them in the first box below. Every three days draw another picture to show how the plants are growing. When the sprouts are about 4 inches tall, transplant them to your outdoor school garden.

ASSESSMENT ACTIVITIES:

These are used or designed to examine student's ability to reason, think critically, and apply knowledge of science to the real world. Students will be encouraged to communicate their ideas through peer interaction, drawings, spoken and written language, hands-on experimentation, and more.

LESSON PLAN IV

Grades: 4-5 and up Duration:Three 45 Min. Periods

Subjects: Social Studies, Language Arts and Science

Purpose: To provide students an opportunity to experience success in taking constructive actions to improve the environment for people and wildlife.

OBJECTIVES: Students will be able to:

1) Identify a problem involving wildlife on their own school grounds
2) Suggest and evaluate alternative means by which to either solve the problem or at least improve the situation
3) Successfully undertake the project; and
4) Analyze and describe the process by which they successfully solved the problem or improve the situation

METHOD:

Students select a school environmental project; conduct research; make plans and follow procedures to accomplish the project.

MATERIALS: Writing Materials

PROCEDURE:

1) Ask the students to think of some ways in which they could improve areas of the school grounds as a home for wildlife. They might generate a list of activities on their school grounds that have a negative impact on wildlife. The list might include litter that poses a hazard for some kinds of wildlife; a muddy area that birds use for water but that has been recommended for black topping to minimize dust and mud; a proposed pesticide spraying that will not only kill the "pest" but perhaps affect other plants and animals; removal of a tree that presently helps contribute to cleaning the air, produces oxygen, and serves as a food and shelter source for varying kinds of wildlife, etc.

NOTES

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14) K. H. AU, M. Calderon. Earth Patrol-Preserve and Protect. Houghton Mifflin Company, Boston 1999.

15) Joseph Cornell. Activities. Creative Classroom Magazine, March/April 1997.

16) Marilee Robin Burton. Branch Out. Creative Classroom Magazine, Sept/Oct. 1998.

17) Leigh-Leigh and Lee. A Child's Organic Gardens Magazine: Way to Grow Big Science USA. 1998.

Suggested Reading List:

Books for Children:

Earthsearch - A Kid's Geography Museum in a Book (Klutz Press) has many science activities. Going Green,A Kid's Handbook To Saving The Planet, by John Elkington et al (Puffin Books) includes an A-to-Z List of Ideas for Action. A Kid's Guide to How to Save the Planet, by Billy Goodman (Avon Books), lays out the challenges facing young environmentalists-and all of us who live here on Earth. Save the Earth! An Ecology Handbook for Kids (Borzoi Books) includes a section called "How to Do It". with ways to write a newspaper story, sample letters to Washington, and tips on holding a press conference to promote your project. Will We Miss Them? Endangered Species, by Alexandra Wright (Charles Bridge), introduces children to a variety of animals that are in grade danger of disappearing and makes a strong case for wildlife protection.

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VIDEOS AND CD-ROM

Our Endangered Earth. Grades 5 and up. This video presents an overview of the intertwined problems of poverty, population growth, and pollution that underlie our global environmental crisis. It introduces major environmental problems and stresses what can be done to help alleviate them. 1990. 1 video. 5870 VD Knowledge Unlimited 1995. CD-Rom. Earth Explorer Claris. For 10 years and up. Phone 1-800-325-2747

Is an interactive environmental encyclopedia. The unique aspect of this reference program is that children can play "What If"

games using interactive simulations. For example, by manipulating the data of various life expectancies, children can shed a whole new light on a country's population growth. The program includes 21 hot topics that challenges kids to weigh the pros and cons of each issue and to respect more than one point of view. The program, which strenghtens critical thinking skills, is ideal for cooperative learning in the classroom.

CONCLUSION

Protecting the environment is a political act as well as a scientific exercise, and opinions about it vary widely. Nature educators say, "Awareness first, then understanding, then action." The few activities I developed for the Unit address these three critical areas. They are also adaptable for use with students of all grades.

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Y.U.T.