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CREATIVE EXPERIENCES FOR ENVIRONMENTAL AWARENESS, INCLUDING
A SIMULATED CAMP: THEMATIC UNITS FOR GRADES THREE AND FOUR

A Project
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Education: Environmental Education

by
Carol Ann Waitman
September 1998

CREATIVE EXPERIENCES FOR ENVIRONMENTAL AWARENESS, INCLUDING A
SIMULATED CAMP: THEMATIC UNITS FOR GRADES THREE AND FOUR

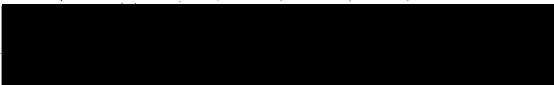
A Project
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by


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September 1998

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August 26, 1998
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ABSTRACT

The project is an activity-based, interdisciplinary curriculum for a simulated outdoor camp that occurs primarily within the elementary classroom. The purpose of the camp is to increase the students' level of awareness of and appreciation for the outdoors.

People have become disconnected with their natural environment because they have fewer experiences in the outdoors. The simulated camping experience will help connect the future generation to the environment.

Students are engaged in environmental lessons for six weeks prior to setting up camp. During the camp, students work in cooperative learning groups to achieve learning objectives that enhance their conceptual understanding of the environment. There are six trail hikes which extend observational skills through journal writing and oral reporting. Curriculum areas include: science, language arts, mathematics, social studies, physical education, art, music, and drama.

The four thematic units provide elementary teachers with detailed lessons plans to prepare and create a simulated outdoor camp for students at their school site.

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INTRODUCTION

The goal of environmental education is to promote understanding and awareness of the world around us. It helps connect us with our surroundings and learn to value the Earth and its natural resources that support life. Environmental education is interdisciplinary and can be woven into every academic subject taught at any level of education. The unique part of environmental education is that it gives purpose to a person's education, and therefore, contributes to guiding students to think critically and act responsibly.

This project, developed for third and fourth grades, allows students to experience the natural environment by providing them with a simulated camping experience at their own school site. Sending students to an outdoor science camp is a way to strengthen ecological awareness. However, science camps are often expensive and therefore, the number of students who are able to attend is limited. The simulated science camp is an inexpensive alternative that enables all third and fourth grade students to participate. The camp promotes environmental awareness, knowledge, attitudes, skills, and participation. It helps students develop healthy attitudes of personal responsibility toward their environment and its resources. The camp helps provide students with the knowledge and skills needed to make meaningful decisions about issues involving their environment and its resources.

Third and fourth grade students participate in six weeks of environmental activities prior to the simulated camp. They begin by comparing and contrasting the cultures and

beliefs of four groups of Native Americans. Then, they take a closer look at Earth and study its geology. Last, they study diversity, adaptation, and interdependence of plants and animals on the Earth. These pre-activities will prepare students for the simulated camp called "Camp Crawly Critters."

At Camp Crawly Critters students put their prior knowledge to use. By using their own school site, students discover and investigate the diversities and adaptations of insects. They hike several trails: 1) a Discovery Trail to explore the school grounds for plants and animals to discover how living things are adapted to where they live; 2) a Wildlife Trail to develop better observational skills; 3) a Geology Trail to examine and discover the composition of rocks; 4) a Museum Trail to organize different species of plants and animals into groups according to their various characteristics; 5) a Forest Trail to learn about trees and their distinct characteristics; and 6) a Native American Trail to understand Native Americans' belief in interdependence. Students also learn how plants, insects, and birds depend upon one another in the fragile web of life. Investigating rocks, learning to improve observational skills, playing Native American games, singing fun camp songs, and preparing skits are some of the many activities that strengthen students' ecological awareness and reconnect students with their natural environment.

REVIEW OF THE LITERATURE

One of the most important challenges for an environmental educator is to meet the need for educating students regarding nature and natural resources. According to the Science Framework for California Public School: Kindergarten Through Grade Twelve, "Educating children for the future is one of the principle aims of any well-balanced curriculum" (California Department of Education, 1990, p. 12).

This review of literature defines and justifies environmental education as one of the avenues needed to meet the necessary goals of our children's education. It summarizes the history of environmental education and how wilderness can be an outdoor classroom to educate students about nature and human relationships. This review defines outdoor education and justifies its goals and contributions to a student's education. Also, it discusses the necessity of early experiences in nature in the development of an ecologically literate citizenry. A multitude of teaching methods and the unique interrelationships that can develop within our own community, schools and classrooms are explained. A discussion of the importance of continuing imaginary play beyond the preschool years is undertaken, and the benefits to all students, including those considered at-risk youth, are also discussed.

Defining Environmental Education

A single definition of environmental education has not been agreed upon by theorists; however, there are those who like the idea of drawing from a variety of definitions (Disinger, 1983). Although there are many definitions, the goals of environmental education are similar. The traditional definition used is: "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution" (Stapp et al., 1969, p. 31). Brennan defined environmental education as "that education which develops in man a recognition of his interdependence with all of life and a recognition of his responsibility to maintain the environment in a manner fit for life and fit for living..." (cited in Disinger, 1983, p. 14). In 1979, Stapp, et al., expanded his definition by stating its goal: "the evolving goal of environmental education is to foster an environmentally literate global citizenry that will work together in building an acceptable quality of life for all people" (Stapp, p. 92).

The goal of environmental education in Project WILD's (Western Regional Environmental Education Council, 1993) curriculum guide is: "to assist learners of any age in developing awareness, knowledge, and commitment to result in informed decisions, responsible behavior and constructive actions concerning wildlife and the environment upon which all life depends" (p. vi).

In 1977, the Tbilisi Intergovernmental Conference on Environmental Education set objectives for environmental education. Included were awareness, sensitivity, understanding, feeling, skills for problem solving and active involvement to find solutions for environmental problems and related issues (Hungerford & Volk, 1990). It was later suggested by Hungerford and Volk of Southern Illinois University that education for greater awareness does not necessarily produce citizens that behave more responsibly. The variables of ownership and empowerment that shape human behavior are also important factors (Estes, 1993).

Each definition and goal can be repeatedly studied, but the educational endeavor is the same: to instill in each individual a philosophy that all living things are important, and that we must learn to respect our world and its inhabitants by becoming more aware of how our world works and its relationship to us.

The Goals of General Education and Environmental Education

We must implement a program that meets the goals of both general education and environmental education. However, it is evident that these goals are the same. The major goal of education is to shape human behavior (Estes, 1993; Hungerford & Volk, 1990). Shaping human behavior is clearly the goal of an environmental educator. Why is environmental education so important in shaping behavior? According to Rick Tinnin, Director of Marine Education Services at the University of Texas Marine Science Institute of Port Aransas, "This is no longer a planet with infinite resources..." and life on Earth

can end abruptly by nuclear war or end more slowly by an environmental catastrophe (Estes, 1993, p. K9). In the forward of Joseph Cornell's book, Sharing Nature with Children (1979), Paul E. Knoop, Jr. stated: "In today's world of overpopulation and high consumption, it is essential that we make an effort to keep people in touch with the Earth: its natural rhythms, the changing seasons, its beauty and mystery" (p. 7). Programs in environmental education can be set up to instill desirable behavior.

The goals of the existing curriculum frameworks can be woven into environmental goals. The goals of the Science Framework for California Public Schools: Kindergarten Through Twelve (California Department of Education, 1990) included:

We want our students to be actively engaged in learning about the natural and technological world in which they live. We want our students to grapple with the ideas of science as they learn the inner workings of the counterintuitive universe. We want students to enjoy learning science and to develop an interest in and responsibility for protecting the environment. (p. vii)

The goals of the English-Language Arts Framework (California Department of Education, 1987) include:

- To prepare all students to function as informed and effective citizens in our democratic society;
- To prepare all students to function effectively in the world of work;

·To prepare all students to realize personal fulfillment. (p. 1-2)

The goals of the Mathematical Framework for California Public Schools (California Department of Education, 1992) include "to equip students with the reasoning tools they need as good citizens; to prepare students for successful work lives; and to develop students' personal capacities to enjoy and appreciate mathematics" (p. 2).

Each framework in the different curriculum areas is reflected in environmental education: to develop students' knowledge, academic skills, attitudes, motivation, and commitment toward the understanding of the world in which we live. According to Orr (1990) "All education is environmental education." He purported that ecological literacy is the purpose of environmental education, which he defined as: "a quality of mind that seeks out connections" (p. 48-53). These connections will help us understand how all living things fit in the scheme of our environment.

History of Environmental Education

Many national wilderness areas and other natural areas are used to educate students about nature and the concept of interdependence. Henry Thoreau was one of America's first educators to teach outdoor education to his students. He believed that: "...many people had forgotten their roots in nature" (Miles, 1986, p. 33). As the gradual development of cities and industries developed, the gap in one's "roots" widened too.

In the 1930s, the "Dust Bowl" created the beginning of

conservation education. The "Dust Bowl" was a name given to an area of 150,000 square miles located in Texas and parts of Oklahoma, Colorado, New Mexico, and Kansas. It was here that natural plants were plowed under by white settlers who were encouraged to plant wheat during World War I. Due to a severe drought between 1934 and 1937 and the loss of natural vegetation, the winds picked up the top soil and caused massive dust and sand storms. These storms were so severe that houses and roads were buried in the sand (Hurt, 1992). The public awareness of conservation of natural resources became a realization at this time.

In 1962, with the publication of Rachel Carson's Silent Spring, people began to realize the result of human impact upon the Earth, and its impact on the Earth's ecological system. The terms "conservation education" and "outdoor education," later became known as "environmental education" (Miles, 1986, p. 34). For three decades, the definition of outdoor education was explained as "education *in, about, and for* the outdoors" (Donaldson & Donald, 1958 in Priest 1986, p. 13). This definition meant learning about nature for the purpose of education in the outdoors (Priest, 1986). "Outdoor education has been described as a potential vehicle for all subjects of the curriculum--art, music, science, mathematics..." (Wilke, 1993, p. 26). As a result of this increased awareness, changes were needed in education to expand instruction beyond the classroom into the outdoors. Educators wanted to do more than lecture and give students instructions. They recognized that "real-life experiences"

are necessary in the development of the cognitive knowledge of students (Knapp, 1992).

The Importance of Starting Early

One of the milestones that environmental educators have is teaching urban students who have "little or no direct contact" with the wilderness and its natural resources. (Miles, 1991). It has been found that many kids are "afraid of nature." Suzuki suggested that we "reconnect those kids and we have to do it very early. Our challenge is to reconnect children to their natural curiosity" (Suzuki, in Estes, 1993, p. K2). "Environmental education, based on life experiences, could help reconnect children to nature during the very earliest years of life. Such experiences play a critical role in shaping life-long attitudes, values, and patterns of behavior, toward our natural environment" (Wilson, 1996, p. 1).

If we are to develop children's ecological literacy, outdoor experiences are necessary. Wilson (1996) believed that many young children may never develop positive attitudes and sensitivity toward the natural environment because their activities are not oriented in the outdoors. Wilson cited Cobb as a source to explain that imagination and "wonder" help us understand and know the world. It is recommended that introducing environmental concepts should be "based on a sense of wonder and the joy of discovery" (Wilson, 1996, p. 1). Pyle (Smith, 1997) suggested, in Thunder Tree, that early experiences with the natural world around us is imperative, before humans will develop into a citizenry that

will protect and preserve the land. He purports that people are not motivated to protect our world because of issues of environmental degradation, but are motivated to protect it when they have developed a connectiveness with the world. Smith cited the work of Mitchell Thomashow's Ecological Identity: Becoming a Reflective Environmentalist as evidence of the necessity of interaction with the natural world at a young age. It is apparent from his study that the children of today are in danger of losing ecological literacy. Children's lives are often too scheduled, making it difficult to find free time for exploration; the land around them is not always safe to roam, or there just isn't enough undeveloped land around them; children are often encouraged to stay indoors because of all the modern technology provided for them; and finally, the absence of noise is hard to come by. Smith suggested that it is the responsibility of educators to find ways to make time for exploration, to protect the wilderness places of the urban and suburban areas, to introduce children to the outside world, to teach children the importance of silence; and to learn how to watch and listen. "Only in this way may they come to love their places and develop the affiliative ties that lie at the heart of environmental wisdom and activism" (Smith, 1997, p. 10).

Teaching To Shape Behavior

Estes defined the goals of education as: "shaping of human behavior" (1993, p. K3). Hungerford and Volk (1990) described the goal of education as that which shapes human behavior, in order that people act with responsibility toward

enhancing our future on this Earth. Technique and teaching strategies are important in influencing desired behavior. Outdoor education utilizes many techniques and strategies that increase knowledge, promote learning, develop thinking skills, and implement transfer of knowledge.

Experiential education is a technique that has proven successful for learning. "Experiential education is the foundation of all outdoor education" and is defined as "learning by doing" (Miles, 1991, p. 5). Traditionally, students listen and read about experiences from others in order to learn. In experiential education, students make their own discoveries and experiment with the knowledge they have acquired, thus the role of the teacher and the student changes as both take on a more active role in the learning process. The teacher learns how to become more effective by learning along with the students; taking part in their discoveries and reflecting on the benefits of their designed activities (Stevens & Richards, 1992).

Miles (1991) defined one of the goals of wilderness education as helping people understand the significance of nature by recognizing the "human spirit"; the reason and emotions connected to nature. Miles cited sociologist James Coleman's description of experiential learning as "inductive" and distinguished it from "information assimilation." Coleman defined information assimilation as listening to the teacher for understanding; and then, applying the understanding to a particular situation, while making deductions. Experiential learning is that which begins with

an encounter where the learner acts, observes, and infers what is taking place. Since the "human spirit" is not easily taught, the need to immerse oneself into nature is necessary in order to understand its significance. Coleman believed when people learn through experiential learning, the concepts learned are not forgotten. Children learn through "discovery, self-initiated activities, and active involvement" (Wilson, 1996). Sobel (1993), author of Children's Special Places, stated: "Authentic environmental commitment emerges out of firsthand experiences with real places on a small, manageable scale" (p. 139). Henry David Thoreau once said that "learning about nature is best achieved by going there" (Miles, 1991, p. 5).

It was discovered by Schicker, that children think highly of places outdoors that "allow personal investigation and manipulation of materials" (1988, p. 14). She concluded, in her research, that "experiential, day-to-day contact with the natural world, and parental support or encouragement, combined with participatory hands-on educational experiences, are the greatest and most effective methods for ensuring wildlife awareness and appreciation" (p. 21). It is the duty of parents and educators to provide children with experiences with natural environments (Schicker, 1988).

Comenius, Rousseau, Pestalozzi, and Dewey proclaimed the importance of meaningful experiences in the educational process. Priest quoted L. B. Sharp, "That which ought can best be taught inside the classroom should there be taught, and that which can best be learned through experience dealing

directly with native materials and life situations outside the school there be learned" (Priest, 1986, p. 14).

It has been discovered, that learning takes place differently through the use of our senses. "...experiential learning requires full use of the six senses (sight, sound, taste, touch, smell, and intuition) and involves the three domains of learning (cognitive, affective, and motoric) of learning" (Priest, 1986, p. 14).

One way that environmental education can be introduced into the classroom, without adding to the already overloaded curriculum, is by using the method of infusion. Infusion is the integration of skills in environmental studies within the existing curriculum, without interfering with their objectives (Ramsey, Hungerford, & Volk, 1992). It has been agreed by many professionals that infusion of environmental education in every grade level should take place within the school curriculum (Simmons, 1989). Research indicated that environmental education can be infused into the existing curriculum successfully (Ramsey, Hungerford, & Volk, 1992).

Environmental education is interdisciplinary. Experts agree that students learn more when information is taught as a whole, not in fragments. Interdisciplinary learning connects the subject areas, making the concepts easier to understand, and serves as a motivation in which students' interests and their level of concentration increases (Willis, 1994). In regard to interdisciplinary instructions, Willis quoted Joan Palmer, Associate Superintendent in Howard County Public Schools as stating: "We have known for a long time

that students learn more, remember more, and apply knowledge more when they are taught in an interdisciplinary mode" (p. 4). She believed that learning takes place when the materials are relevant and meaningful; and therefore, connected as a whole.

Another strategy of teaching environmental education, is cooperative learning in which students with diverse abilities work in small groups. According to Feaster (1995), cooperative learning is "a way to involve students in their own learning and a way to develop social interaction skills of students" (p. 1). It has been found that students who work in cooperative learning groups are able to master material better than those who work independently. It has also been shown that when students work together as a team, they share common goals and are more successful. Students are motivated to do their best and to help each other learn and grow (Salvin, 1987). This method of helping each other solve problems fits the goals of an educator to shape behavior and develop citizens who behave in desirable ways (Hungerford & Volk, 1990).

In Democracy and Education, John Dewey (Knapp, 1992, p. 30) said: "An ounce of experience is better than a ton of theory, simply because it is only in experience that any theory has vital and verifiable significance." However, direct experience is not enough to improve teaching and learning. Reflection is a technique used to promote meaningful experience. Reflection requires that the student with direct experiences, act upon them and create

consequences, and learn from these consequences. If learning is to take place, students must "elaborate upon and question their experience" (Knapp, 1992, p.21). Reflection techniques used by teachers can increase the students' knowledge. The goal of a reflection session is to help students think.

Experiences are the acts of living through events.

Reflection can analyze experiences and find patterns which connect them. When we experience something with meaningful intent, learning takes place. Reflection sessions are successful only when students want to understand the meaning of their experiences and the relationship of one experience to another. At such a time, students are functioning at a higher level of thinking. Promoters of reflective teaching include Socrates, Dewey, Piaget, and Vygotsky (Knapp, 1992).

Changes in education and how we teach are in a state of continual change because we are discovering more about how children learn. Making meaning from experience is an important part of learning. To increase knowledge and transfer that knowledge to help solve other problems demonstrates the importance of reflection (Knapp, 1992).

Making the Curriculum Fit the Learner

We need to develop a citizenry that cares for the environment in which we live in order to preserve and protect it for future generations (Smith, 1997). Developing and shaping behavior to promote knowledge, academic skills, attitudes, motivation, and commitment are not easily met with the traditional "pencil and paper" style of teaching.

According to Midkiff, Roark, and Towery (1991), "Motivating

students to learn and making learning meaningful are two factors that are the key to any child's academic success" (p. 1). They suggest that individual learning styles need to be considered before educators make a decision on which type of strategy they will use to teach. In addition, they suggested that "at-risk" students are destined for failure in the traditional "pencil and paper," "drill and practice" method of teaching, in which students learn by listening, imitation, repetition, and completing worksheets. In order to meet the academic needs of all students, it becomes necessary for educators to use a variety of methodologies to accommodate the different learning styles (Midkiff et al., 1991).

According to Herr (1981), effective learning takes place when the whole brain is engaged. She explained the function of the left brain as being responsible for "analysis of words while the right brain processes other informational codes such as emotions, movement, imagination, and creative and intuitive activities" (p. 1). In Herr's article, guided imagery is described as a "mental experience" guided by a teacher to stimulate imagination. Herr believes that engaging students in the process of guided imagery stimulates the left and right side of the brain. She concluded that using guided imagery as a teaching technique, promotes effective learning for all students. It assists student involvement in the material presented in class and stimulates the creativity of student and teacher.

The successful use of guided imagery in education has

been reported by Galyean (1980). Her three-year study utilized guided imagery/meditative type of activities. It was reported by several teachers, that their students were motivated positively by imagery/meditative activities. This, in turn, determined the teachers' decision to extend the imagery/meditative activities on a weekly basis for presenting language and vocabulary skills. Galyean also reported a three-month project in which the teacher introduced a guided imagery activity with one of her two Spanish classes. Both classes consisted of low achievers and of students disinterested in school. In the experimental group, the teacher began by leading two guided imagery meditations, three times per week, for one month. After the first month, the meditations were done daily to begin the class. The students were asked to write and lead meditations on their own. This intervention took five to seven minutes of class time and was repeated daily. No intervention of guided imagery was used in the control group. The purpose of the guided imagery activity was to develop students' inner strengths, help students see themselves as successful learners, and see the teacher as someone who helps them become successful. The dependent variables that were studied were attentiveness, involvement, interactions and supportive responses to the teacher. The instrument used was an observation sheet completed by students, the teacher, and other school personnel. The students analyzed their own behavioral changes. The teacher and other school personnel observed the students' behavior changes after the

intervention of guided imagery was made. When tested, the experimental group was observed as having considerably less negative behavior than the comparison control classroom. In her study, Galyean concluded: "The finding of differences in negative or disruptive behaviors between the two classes suggests that the students' report about their experiences are valid: the meditations created a climate of positive self-image and community, in which fear, tension, put-downs are no longer evoked or needed" (p. 95). According to Galyean, other published documents testified that the students using guided imagery/meditative type activities are "more relaxed, focused, pay closer attention to material being taught, get along better with each other, are more loving with each other, and in some cases, seem to achieve more of the subject being taught" (p. 87). Galyean (1983) suggested that guided imagery activities "expand the range of intellectual capabilities and increases students' interest in the penchant for current curricular offerings" (p. 58).

Whether it is called imaginary play, pretending, make-believe, or guided imagery, it serves as a valuable tool for children as they grow and learn. These skills develop at a very early age and continue in altered forms throughout ones lifetime. When a child is between the ages of two and six, imaginary play helps develop social skills and an understanding of personal relationships. Children learn cooperation, communication, and sharing through imaginary play. Although imaginative play takes on many forms as a child grows and develops, it is an important way to learn to

cope with reality at any age level. In young children, pretending helps children deal with facts they have discovered about life. Pretending is a form of thinking, concentrating, and re-creating behavior that has been observed (Segal & Adcock, 1982). These authors stated: "...imaginative play helps children deal with the complex intellectual task of distinguishing between real and pretend" (p. 5). They maintain that there is a correlation between pretending and cooperativeness, self control, and intelligence; that "pretending has the effect of increasing social, emotional, and intellectual development" (p. 6). They further concluded that everything children do; their way of thinking is "filtered through imagination." Educators need to focus on how children learn to think and learn in the world in which they live.

Hacker (1993) listed the advantages for teachers and students to learn skills in creative dramatics. For teachers, it increases cooperation and group work, reduces stressful situations, enhances conflict resolution, helps the shy and insecure students feel comfortable by getting them involved in group exercises that do not single them out, and creates a sense of accomplishment and freedom. The advantages to students are pointed out as: increasing cooperation skills, creativity, and self-esteem. Hacker concluded: "It is time to let more of the "child" out in our children to create more opportunities for the kind of play that will enhance their creativity, increase their self-esteem and start them moving in the direction of becoming

adults who care and are involved in their communities”
(p. 8).

The goal of an environmental educator is to teach environmental literacy to all students; however, because of its connectiveness to ourselves, it emphasizes the interdependence we share with the environment. This connectiveness enables the teacher to teach to students with different learning styles; and therefore, meet the needs of “at-risk” students. According to Stoner (1990), one possible “solution of the dropout problem is the infusion of environmental education” (p. 65). Because environmental education is interdisciplinary, motivating, and offers relevant content, it meets the needs of all learning styles. Stoner stated: “By connecting the academic, emotional, and social needs of at-risk students with the benefits of environmental education, we contribute to the solution of two national problems: environmental literacy and student dropout” (p. 81).

GOALS AND OBJECTIVES

The goal of this project was to design a program that would bring an outdoor camp to school as a preparation for a real outdoor camp and/or, as a chance to give students a way to participate in an outdoor day camp, when otherwise, they were unable to attend a real camp. The purpose of the project was to increase students' awareness of, and respect for, the environment and therefore, create responsibility and commitment towards the Earth.

The goal was achieved in the following manner:

1. The development of three thematic units covering the environmental topics that includes: Native Americans, geology, diversity, adaptation, and interdependence of the plants and animals upon the Earth. These units are a preparation to the simulating science camp.
2. The development of a thematic unit that creates a simulated science camp which includes: a Discovery Trail, Wildlife Trail, Museum Trail, Forest Trail, and Native American Trail.
3. The development of units that includes selected children's literature and activities which include the curricular areas of science, language arts, mathematics, social science, physical education, and creative arts.
4. The author has, and will continue to provide inservices, about the project to interested teachers.

5. Camp activities were field-tested by the author and eight colleagues, which resulted in modifications of the lesson plans.
6. Involving the PTA and other interested parents to consider providing fifth grade with a real outdoor science camp, as a follow-up to the simulated camp experience in third grade.

DESIGN OF PROJECT

The design of the project consists of four thematic units. The first thematic unit is based on the concept that Native Americans depended upon the Earth's natural resources in order to survive. The second thematic unit explores how the Earth is a complex planet that has existed for billion of years. Its composition and complexity are not to be taken for granted but are to be appreciated and understood. The third thematic unit develops the idea that all living things that inhabit the Earth are dependent upon each other and interdependent with their natural and physical environment. The last thematic unit is a simulated science camp which applies students' knowledge about the environment.

Most of the lessons were created by the writer. However, some of the lessons were adapted from other curricular guides. The main curricular guides used were: Project Learning Tree (American Forest Foundation, 1993), Project WILD Aquatic (Western Regional Environmental Education Council, 1992), and Project WILD (Western Regional Environmental Education Council, 1992).

The project consist of lessons to be taught over a six week period. Each unit includes the topic, environmental concept, background, and recommended literature. Each lesson includes objectives, subject areas, background, preparation, and procedure.

IMPLICATIONS FOR EDUCATION

The project was design to fit into the third and fourth grade curriculum, although it could be adapted to other grade levels. The first three units were designed as pre-activities that serve as a foundation for the simulated science camp. The simulated science camp is a hands-on experience that enable students to apply their knowledge of the environment, raising their awareness, and enhancing their appreciation of the outdoors.

Most of the materials used in the project are available in a typical classroom. Preparing for the simulated camp requires teachers to read over the lessons ahead of time and prepare as needed. Scheduling guest speakers enhances the program but needs to be planned many weeks in advance.

Getting parents and students involved helps facilitate their understanding of the environment as well as support for the camp.

RESULTS

Most of the units in the project were field-tested over seven years with the author's second and third grade classes. Other second and third grade teachers have field-tested units as well. The last two units have been field-tested several years in a row. The results of fielding-testing the project have made it possible to modify and change the project to accommodate various grade levels. Included in this project is a schedule designed to accommodate five classes.

Students, as well as their teachers, enjoyed participating in the simulated camp. Daily journals reveal the height of students' environmental awareness. After a walking field trip to an area just outside the school one student wrote, "We discovered a floor that had a lot of footprints. We saw a roadrunner looking for food. We looked for evidences that an animal lives there. Then we went down stream. We put our feet in the water. When I sat down the water was flat like it was massaging my feet."

It was very evident that students who participated in the first three thematic units had greater understanding of the activities done in the simulated camp, than new students, who only experienced the camp.

The results of the camp have major impact on the students attitude and respect about the outdoors. Students learn to look, watch, listen, and investigate, instead of destroy the natural environment and its inhabitants. Many students who have participated in the project have returned to help by becoming camp counselors. A camp counselor helps

set up trails and guides students to get the most use out of the trails.

Both teachers and students have expressed their appreciation at participation in the camp experience by making books, banners, and cards. Many of the teachers who have participated in the simulated camp have expressed their desire to continue their participation in upcoming years.

After reading the literature review one teacher wrote,

"Nature provides a connection which can be stable and comforting for the child. As the child learns about natural laws through 'hands-on' experiences, he/she begins to believe that each aspect of nature has an important role and hopefully, will develop a sense of himself/herself being part of a wondrous world. Of course, environmental education will not solve all the complex problems of a child at risk, but will provide a much-needed, positive setting, in which to grow and develop intellectually, mentally, and psychologically."

APPENDIX A
Thematic Units

Thematic Unit I

Topic: NATIVE AMERICANS

Environmental Concept: People and especially Native Americans depended upon the Earth's natural resources in order to survive.

Background:

About 25,000 years ago, the Native American ancestors came to North America. These people formed many different groups and tribes throughout the United States, each with their own diverse culture. Despite the diversity between the various groups, Native Americans were all united in their beliefs concerning the Earth and respected and cherished the land. Native Americans believed that they should live in harmony with the land. Their way of life depended upon the area of land on which they lived and the natural resources it offered. They used the natural resources needed to survive and gave back to the Earth what they could (American Forest Foundation, 1993).

The Kwakiutl (kwah kee OO duhl) tribe, who lived along the northwestern coast of North America, from the southern tip of Alaska to Northern California, believed that things in nature were created so that all life would benefit one another. An example of this is their belief that the salmon swam upstream to feed the villagers. An offering to give back what was taken would be the return of the bones to the water in which the fish were caught. In this way, they believed that the fish would get a new body and return the following year to feed the villagers again. The Kwakiutl tribe's main natural resource was the cedar tree. They made clothing, masks, ropes, mats, totem poles, wooden beaters, and even their homes, called "long houses," from it. The water was another natural resource for them. It gave them trout, halibut, salmon, clams, and seals for food. The men were wood carvers and the women were weavers. Some of the ceremonies they celebrated were weddings, births, and funerals. It was at these ceremonies that they danced, feasted, and told stories. These stories were mostly about their families and about nature (Armento, Nash, Salter, & Wixson, 1991).

The Cheyenne, who lived on the plains of the United States, believed that the power of nature was like medicine and could help people. They believed that all things on Earth were part of the cycle of nature. Because the Cheyenne lived on the plains, they did not have fish readily available to them. Instead, they farmed plants such as beans, corn, and squash. They hunted buffaloes, deer, and rabbits for their meat. Buffalo was considered their main natural resource. They used the buffalo to make the walls of their home, the tipi. The Indians of the plains traveled frequently. The tipi was easy to assemble and move from place to place. All parts of the buffalo were used and nothing was wasted. Buffalo was their main diet when it was available. The animal's skin was used for clothes, shoes, ropes, and shelter. The bones were used to make tools. Other

natural resources were the trees to make shelter and tools, the soil to cultivate crops, and the water for drinking. The horse dramatically changed their way of life. The horse made it possible for them to move more quickly and effectively in order to hunt down the number of game they needed to survive (Armento, et al., 1991).

The Navajo (NAV uh hoh) tribe, who lived in the southwestern desert in the United States, believed that staying healthy meant living happily with the land, air and all living things. Many of their prayers were about the Earth. They believed that the Earth took care of them. The Earth gave them their home, the hogan. The hogan was a one-room house made from mud and logs. They also believed that the Earth taught them how to grow plants such as corn, beans, and squash. They painted pictures on the ground with the color of the Earth. The sick would sit inside the painting and they believed the painting's powers would help the person get well. The Navajo tribe farmed and wove cotton and wool for clothing. They used plants and berries to dye the wool. They also raised livestock such as sheep, horses and goats. To the Navajo people, a rainbow was a sign of life, giving them rain for their crops. Their natural resources were water and soil (Armento, et al., 1991).

PREPARING STUDENTS FOR PROJECT

Week 1, Activity 1: Totem Pole Stories

Objectives:

1. To help students understand the way of life of the Kwakiutl Indians in relationship to their environment.
2. To show the importance of storytelling

Subject Areas: Environmental science, social studies, creative arts, and language arts.

Preparing:

1. Explain to the students that there were many different groups of Native Americans that lived in the United States. Explain that it would be impossible to study all the groups in the United States in a week, so the study will concentrate on three Native American groups: the Kwakiutl of the northwest coast, the Cheyenne of the plains, and the Navajo of the southwestern deserts. These groups were chosen because they represent different types of land: coastal areas, plains and the desert.
2. Have a brief discussion and identify where the different tribal groups lived. Focus on the tribes your students will be studying. Begin with the Kwakiutl tribe.
3. Tell your students that the Kwakiutl tribes were good carvers and carved totem poles to represent their family history or to tell a story. At this point, the teacher should read a Native American story or legends or read a nonfiction book about the history of the Native Americans' origins. (**See Recommended Literature List.**) Explain to the students that we all have a family history that tells something about ourselves. As an art and writing activity, students will design their own totem pole that illustrates their own family history and then write about their design.

Materials:

1. Tissue rolls or paper towel rolls
2. Different colored scraps of construction paper
3. Glue
4. Paste
5. Scissors
6. Writing paper and pencils

Procedure:

1. Give each student a tissue roll to design, using scraps of construction paper. Explain to the students that the design should represent a story about their family or themselves.
2. After students design their totem pole, have them describe their design in written story.
3. Share totem poles and stories with the rest of the class. Totem poles can be strung together to decorate the classroom and stories can be put on the bulletin board for others to read. Besides being decorative, it makes a good "reading the room" activity.

Week 1, Activity 2: Life Cycle of the Pacific Salmon

Objectives:

1. To help students understand the importance of the salmon to the survival and existence of the Kwakiutl people.
2. To simulate the life cycle of the Pacific Salmon in order to show the factors that affect its population.

Subject Areas: Environment science, social studies, geography, and physical education.

Background: Salmon has not only been part of the heritage of the human culture but it is also an important element for the ecology of the California and the Northwest. Those that share the salmon's habitat depend on them for their food and livelihood. Various plants and animals depend on the salmon, including birds, otters, bears and insects. Salmon are a huge source of nutrients for plants and animals. There has been a large decline in the salmon population due to logging and resource extraction. The waters have become too shallow, warm, and muddy for some salmon to survive. The salmon must travel 15,000 miles, fighting against currents and predators, to migrate to their spawning area.

Preparing:

1. Ask students if they know what migration means? Tell students that migration is a journey and some animals journey from one habitat to another during their lifetime.
2. Ask students to name some animals that they know migrate, such as whales and some types of birds. Briefly discuss the migration patterns of other animals.
3. Tell students that the Kwakiutl Indians depended on the salmon for their survival. In order to get a better understanding of the life cycle of the Pacific Salmon, tell students that they will participate in a simulated game to learn about its migration patterns.

Materials:

1. A large area
2. Approximately 500 feet of rope or cones for boundaries
3. Two cardboard boxes
4. 100 tokens

Procedure:

1. Set up a large area as shown in the diagram.
2. Assign roles to each of the students.
3. Choose two students to be the turbine in the hydroelectric dam.

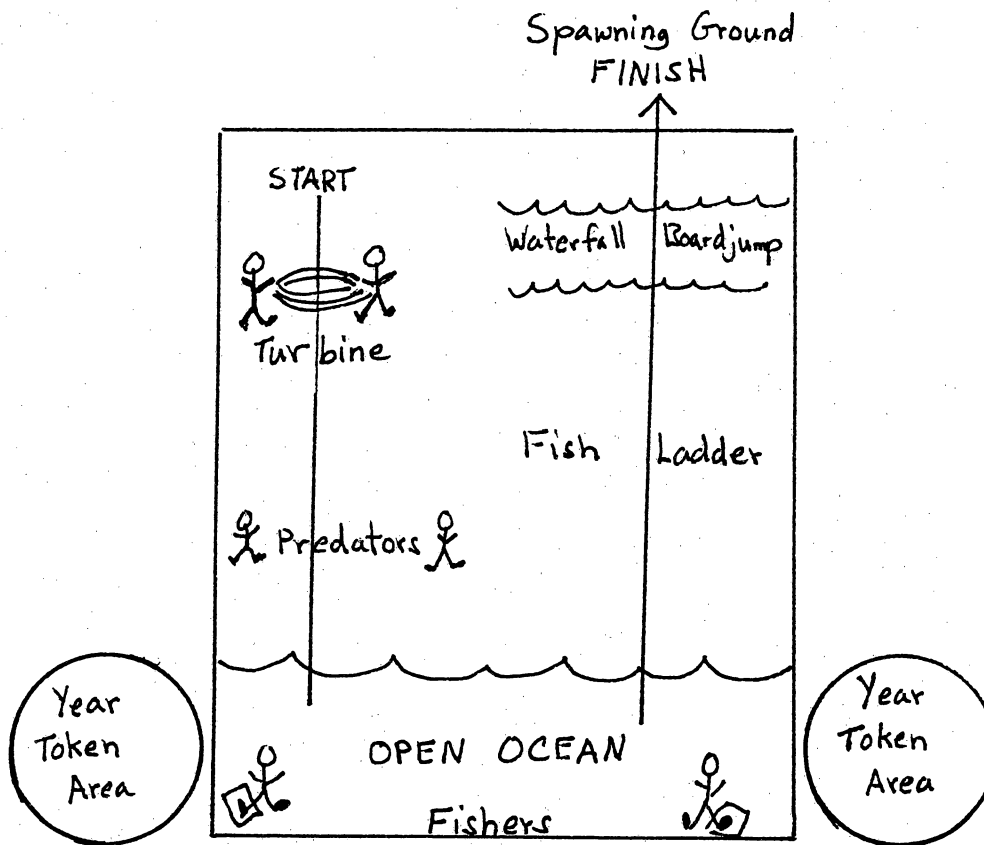
- These two students will turn a jump rope.
4. Choose two students to be predatory wildlife. These two students will place themselves below the turbine where they eat salmon headed downstream.
 5. Choose two students to be humans in fishing boats. These students must keep one foot in the box at all times to lessen their speed and ability to maneuver.
 6. All remaining students are salmon.
 7. Direction to begin game:
 - a) Begin with all salmon in the spawning ground. At the signal of a whistle the salmon start their trip downstream. The first major challenge is the turbine at the dam. At most dams there are escape staircases to guide migrating salmon past the turbine. The student salmon cannot go around the jump rope swings, but they can slip under the swingers arms if they do not get touched while doing so. A salmon dies if it is hit by the turbine (rope). If a salmon dies, it becomes part of the fish ladder. (See diagram.)
 - b) Those salmon that pass the turbine must take the challenge of getting past some predators. A salmon is caught when the predator catches the salmon with both hands. Dead salmon are taken by the predator to become part of the fish ladder.
 - c) Those salmon that pass the predators safely, must get past the fishing boats. The salmon must move back and forth across the ocean in order to get four tokens. Each token represents one year of growth. Once each fish has four tokens it can begin migration upstream. The salmon that are caught are escorted to the fish ladder and become part of the ladder.
 - d) The salmon with four tokens must walk through the entire pattern of the fish ladder (This gives the students the idea of how hard the upstream journey can be). The fish ladder is made of students who kneel on the ground on all fours, parallel to each other with a body-wide space between them. Once through the ladder, the salmon faces the broad jump waterfall. The two former turbine students will monitor the jump. The salmon must jump the entire breadth of the water fall. If it fails to make the jump, then it must return to the bottom of the fish ladder and come through again.
 - e) The two students that were the predators at the beginning of the journey become predators again. This time they represent the bears. Again, they must catch the salmon with both hands. If a salmon is caught, it is escorted to the

fish ladder.

f) The activity ends when all the salmon that can, reach the spawning area.

Discussion Questions:

1. What were the barriers that prevented many salmon from completing their migration journey? Were all these barriers here 100 year ago? Can you name some other barriers that might interfere with the life cycle of the Pacific Salmon? (space, availability of food for the salmon, water levels, pollutants, and changes in land use; as well as other human activities).
2. Explain what you learned by participating in this activity.
3. How could these barriers interfere with the survival of the plants, animals, and people who depended upon them?



Game adapted from Project WILD Aquatic, 1992, "Hooks and Ladders," p. 76-81.

Week 1, Activity 3: Buffalo As A Resource

Objectives:

1. To develop an understanding that Native Americans never wasted the natural resources that they depended upon.
2. To understand how important the buffalo were to the Native Americans' survival.

Subject Areas: Environmental science, social studies, geography, creative arts, and language arts.

Background:

The Cheyenne Indians lived on the plains of the United States. Their main resource was the buffalo. All parts of the buffalo were used; nothing was wasted. The hide was used as clothing, shoes, and tipi walls. The bones were used to make tools and the meat was their chief source of food (Armento, et al., 1991).

Preparing:

1. Define the meaning of plains. Locate the plains on a map of the United States. Ask students what types of plants and animals they think lived on the plains?
2. Explain to students that the Cheyenne Indians depended on the buffalo for their survival. Explain that they will be working on an activity to help them understand the importance of the buffalo to the Cheyenne Indians.
3. Each student will construct an item that represents something that the Cheyenne made from buffalo. Later, they will write about their item.

Materials:

1. Large paper grocery bags to be used as the hide.
 - a. Crayons or markers
 - b. Scissors
2. Soap to be used as the bones.
 - a. plastic knife

Procedure:

1. Each student can choose if they want to make something from the hide or the bones of the buffalo.
Directions for making something from the hide:
 - a) Cut the grocery bag in the shape that illustrates what it is being made: for tipi, clothing, or shoes.
 - b) Draw a design on the bag that conveys a message. The

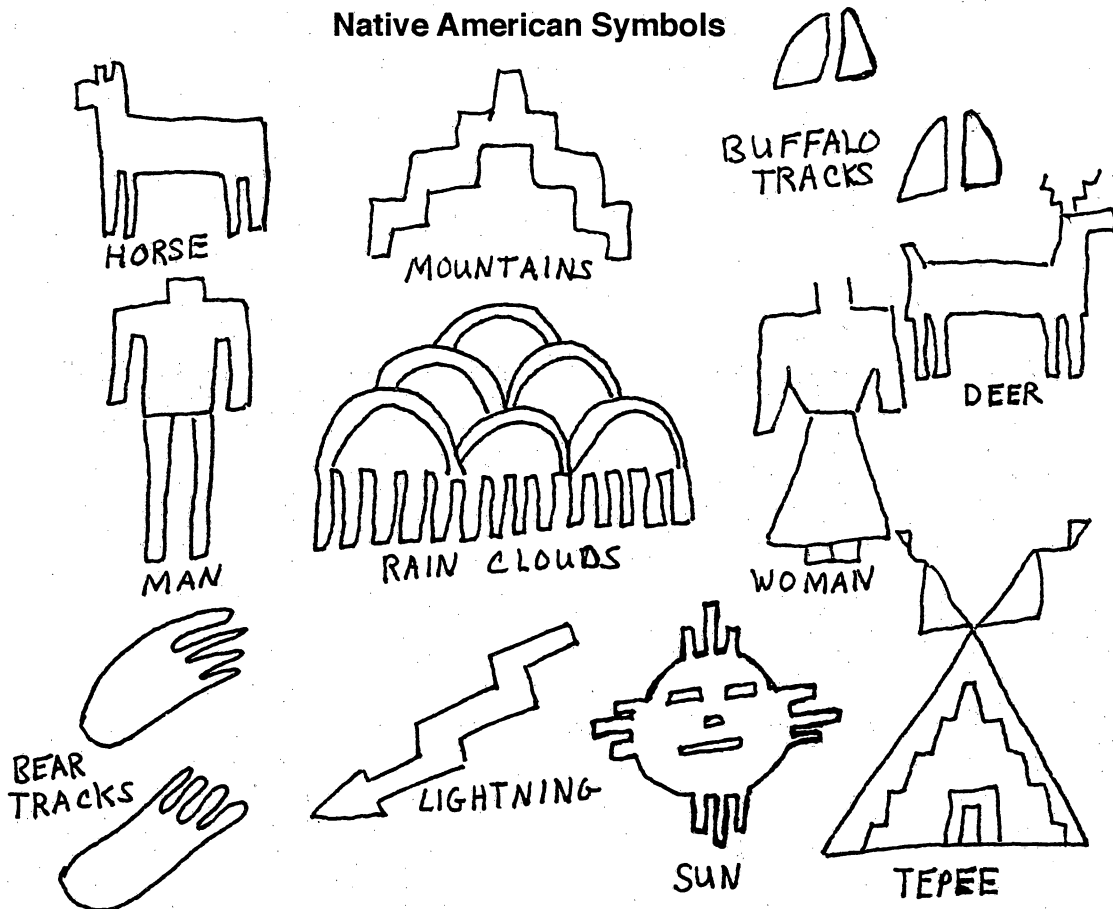
Cheyenne Indians used pictures to symbolize their message. Students can make up their own symbols or use the ones presented in class.

- c) The message should have something to do with the Cheyenne's belief that Nature has great powers.
- d) After the message has been made, the students will wad up the bag over and over again to make the bag look and feel like a hide of an animal.
- e) Hides and messages can be shared with the rest of the class.

Directions for making something from the bones:

- a) Give each student a bar of soap and plastic knife. Using the knife, have the students carve a tool the Indians may have used.
- b) Students are instructed to write about what tool they carved and how the Indians may have used the tool.

Native American Symbols



Week 1, Activity 4:

Bag Garden

Objectives:

1. To watch a corn plant grow from a popcorn seed and to be able to identify the root, stem, and leaves.
2. To understand the importance of crops to the Navajo Indians and the barriers that could hamper their growth.
3. To be able to identify the important factors that are needed in order for a plant to grow successfully.

Subject Areas: Environmental science, general science, social studies, and geography

Background: The Navajo Indians lived in the southwestern desert of the United States. Farming and raising livestock were their way of life. Corn was their main crop. They also liked to weave their clothing from sheep's wool. They used the sand of the Earth to create pictures on the ground. They believed that the sick would get well if they sat inside the painting due to its powers (Armento, et al., 1991).

Preparing:

1. Locate the southwestern desert of the United States on the map. Tell students that the Navajo Indians depended on the land to grow their crops.
2. Tell students that we will begin an activity that helps us understand what is necessary for plant growth. This activity will extend for three weeks.

Materials:

1. White butcher paper
2. Pencils, markers or crayons
3. Ziplock plastic sandwich bags
4. Paper towels
5. Soil
6. 1/2 pint size milk cartons
7. Scissors
8. Eye droppers
9. Water
10. Ruler
11. Popcorn seeds
12. Small pebbles

Procedure:

1. Tell the students that they will be making a bag garden by planting a seed in a plastic bag and watching how it grows. Before they actually grow a seed, find out what they know about the way seeds grow. Put students in groups of four. Give them butcher paper, pencils, and markers or crayons and have them draw a picture of a growing seed, labeling the roots, stems, and leaves. Let them share their knowledge with the rest of the class. During their presentations ask the following questions:
 - a. What is the function of the roots, stem, and leaves?
 - b. Why did they draw the roots and stem in that particular direction?
2. Give each child five popcorn seeds, a Ziplock bag, a paper towel and a pair of scissors.
3. Fold the paper towel in half. At the fold, cut five small slits about three inches apart. Place each seed on the slit inside the fold. Place the paper towel in the Ziplock bag with the fold at the bottom. Do not close bag. Use Ziplock bags because the bags hold their shape hanging in a window. Using an eyedropper, put about 1/4 inch of water in the bag.
4. Each day, the students check their bag, and draw and record their findings. Students can measure the growth of the root and stem of each seed. Taking the average growth of the five seeds, the students can graph the growth on graph paper. Teacher may want to model a seed growth with the whole class. Students can draw the seed every three to five days. Each drawing should be labeled with the date.
5. Compare the final drawing with students' predicted drawing at the beginning of this lesson.
6. Students should discover that the reason the plant grows as it does and correlate that with their final drawing.
7. After two weeks, it will be time to transplant the seeds into milk cartons. Have students gather small stones outside. Put small holes in the bottom of the carton for water drainage. Put stones at bottom of the carton, about 1/2 inch deep. Put soil on top of stones. Make five holes in the soil with a finger and place seeds in each hole. Cover the hole with dirt and water.
8. Watch the seed continue to grow.

Week 1, Activity 5: Sand Paintings

Objectives:

1. To understand the meaning of sand paintings to the Navajo Indians.
2. To be able to make one's own meaning from a sand painting.

Subject Areas: Social studies, creative arts, and language arts

Background: The Navajo Indians believed that the spirits instructed them to paint pictures of the ground with colors of the Earth. They also believed that the sick would sit inside the painting so that its powers would help that person get well (Armento, et al., 1991).

Preparing:

1. Mix each color of poster paint with water. The consistency should be thin. In a large bowl, mix poster paint with sand until it is the desired color. Then let dry. Repeat process with each color.
2. Name a color or raise a color in the air. Ask students what each color reminds them of or how it makes them feel. Write their thoughts on the board.
3. Tell students that the Navajo Indians used the colors of the Earth to send a message of healing for the sick.
4. Explain to students that they will be making a design with colored sand that has a message

Materials:

1. Plaster sand
2. Poster paint (black, brown, red, yellow, orange, green, blue)
3. Bowl
4. Stirring stick
5. Thick cardboard
6. Pencil
7. Glue
8. Lid of shoe box

Procedure:

1. Use the lid of a shoe box glued on a hard, thick piece of cardboard. Paint glue on the bottom so that the sand will stick.
2. Fill box with uncolored sand so that the bottom of the box is covered.
3. Pour some glue on the top of uncolored sand and make a design. Take a pinch of one of the colored sands; trickle it carefully over the glue design.

4. The finished product will look like a colored design in the sand.
5. Have students write about their design or write a story using the design as the main idea of their story.

Week 2, Activity 6: Project on Native American

Objective:

1. Students will be able to use prior knowledge and research skills to report about a particular Native American group.

Subject Areas: Environmental science, social studies, geography, creative arts, and language arts.

Preparing:

1. Review the regions on the map where the three Native American groups lived. Discuss the different types of land where each group lived and how the land was an important part of their existence and survival.

Materials:

1. The materials are dependent on the students chosen project.

Procedure:

1. Divide the class into three groups. Put the names of the Native American groups you will be studying on individual pieces of paper. Place the paper in a basket for each group to draw from.
2. Each group of students is responsible to report back to the class information they have discovered about their particular tribe. Books on the different tribes to be studied will be supplied to each group of students. It is the students responsibility to come up with some information and a project that represents the group they are studying.
3. The worksheet, "Report on a Tribe of Native Americans," will help students get started.
4. Teacher will facilitate their learning by meeting with the different groups to find out what they have learned and what materials they will need to complete their projects. The teacher can suggest that students cook, make a model of the tribe's home, teach the class an Indian game, or dramatize an Indian tale. The objective is for students to do something that characterizes that particular Indian tribe, based on their report and findings.
5. Finished projects will be shared with the rest of the class.

REPORT ON A TRIBE OF NATIVE AMERICANS

Worksheet

Names of the students in your group:

Group Leader _____

Recorder _____

Research Investigator 1 _____

Research Investigator 2 _____

Oral Presenter 1 _____

Oral Presenter 2 _____

NAME OF THE TRIBE _____

BELIEFS:

LOCATION OF TRIBE: _____

HOUSING: _____

NATURAL RESOURCES AVAILABLE THE THE AREA:

TOOLS USED: _____

FOOD SOURCES: _____

WAY OF LIFE: _____

**Recommended Literature
For Native American Lessons,
Thematic, Unit 1**

Non-Fiction

Aliki. ***Corn is Maize: The Gift of the Indians***

Harper Collins Publishers, 1976

Non-fiction

The history and life cycle of corn are described.

Amon, Aline. ***Native Americans on Nature***

Atheneum, 1981

Poetry

Celebration of nature through Native American songs, prayers and the Indian way of life.

Ashrose, Cara. ***The Very First Americans***

Grosset & Dunlap, Publishers, 1993

Non-fiction

Describes some of the Indian tribes in North American.

Brandt, Keith. ***Indian Crafts***

Troll Associates, 1985

Non-fiction

Explains how the North American Indians used tools to make clothing, weapons, cooking implements, and ornaments from the raw materials around them.

Brandt, Keith. ***Indian Festivals***

Troll Associates, 1985

Non-fiction

North America Indian Tribes' Rites and Ceremonies.

Brandt, Keith. ***Indian Homes***

Troll Associates, 1985

Non-fiction

The descriptions and characteristics of the different types of homes used by North American tribes.

Brandt, Keith. ***Indians of the Plain***

Troll Associates, 1985

Non-fiction

Describes the history, customs, people, and day-to-day life of the various Indian tribes that lived on the prairie lands between the Mississippi River and the Rocky Mountains.

Brandt, Keith. ***Indians of the West***

Troll Associates, 1985

Non-fiction

Describes the different life styles of the Indian tribes that lived in the West. The traditions and lifestyles of each tribe were shaped by the land.

Haslam, Andrew & Parsons, Alexandra. ***Make it Work! North American Indians***

Scholastic Inc., 1995

Non-fiction

A study of Indian life, their origins, clothing, housing, family life, food, sports, artwork transportation, hunting, communication, and religion.

Prentzas, G.S. ***The Kwakiutl Indians***

Chelsea House Publishers, 1993

Non-fiction

Describes the history and culture of the Kwakiutl Indians

Sonneborn, Liz. ***The Cheyenne Indian***

Chelsea House Publishers, 1991

Non-fiction

Describes the history and culture of the Cheyenne Indian.

Thomas, David. ***Native Americans***

Weldon Owen, 1995

Non-fiction

The history, social life and customs of Indians of North America

Tomie de Paole. ***The Popcorn Books***

Holiday House, 1978

Non-fiction

Describes the history of popcorn.

Wood, Leigh. ***The Navajo Indian***

Chelsea House Publishers, 1991

Non-fiction

Describes the history and culture of Navajo Indian.

Fiction

Armer, Laura Adams. ***Waterless Mountain***

David McKay Company, 1931

Fiction

A young Navajo boy grows from boyhood into adulthood. It provides a realistic look at Navajo life during the early 1900s.

Baylor, Byrd. ***And It Is Still That Way***

Scribner, 1976

Folklore

This collection of legends, told by Arizona Indians, includes information about the tradition of storytelling.

Baylor, Byrd. ***They Put On Masks***

Scribner, 1974

Folklore

The use and meaning of ceremonial Indian masks are explained. Related tribal legends and charts are included.

Baylor, Byrd. ***When Clay Sings***

Charles Scribner's Sons, 1972

Poetry

When putting together pottery shards, the past Indian ways are revisited.

Cohen, Caron. ***The Mud Pony***

Scholastic Inc., 1988

Fiction

A poor Indian boy wished for a horse so he made one out of mud. To his surprise the mud pony comes alive.

Goble, Paul. ***Adopted by the Eagles***

Bradbury, 1994

Folklore

A legend about a boy adopted by eagles. He learns the meaning of bravery.

Goble, Paul. ***Buffalo Woman***

Bradbury, 1984

Folklore

The legend of the kinship between people and animals.

Fisher, Anne. ***Stories California Indians Told***

Houghton Mifflin Co., 1957

Folklore

Myths and legends told by California Indians

Martin Jr., Bill & Archambault, John. ***Knots on a Counting Rope***

The Trumpet Club, 1987

Fiction

An Indian grandfather conveys to his grandson events and the passage of time through knots on a rope.

Miles, Miska. ***Annie and the Old One***

Little, 1971

Fiction

Annie comes to accept the death of her grandmother as she recognizes the wonder of life.

Perrine, Mary. ***Nannabah's Friend***

Houghton Mifflin Co., 1970

Fiction

A Navajo girl feels lonely tending sheep by herself for the first time until she makes some dolls to keep her company. Then she meets a friend.

Taylor, C. J. ***Nine Native Stories of the Way Thing Began***

Tundra Books, 1993

Folklore

Myth and legends told by Native Americans

Toye, William. ***The Loon's Necklace***

Oxford University Press, 1977

Folklore

In this Indian tale, the loon receives its necklace feathers.

Whitney, Alex. ***Stiff Ears: Animals Folk Tales of the North American Indian***

Walch, 1974

Folklore

These animal hero folk tales include information on Indian culture.

Thematic Unit 2

Topic: GEOLOGY

Environmental Concept: The Earth is a complex planet that has existed for billions of years. Its conformation and complexity are not to be taken for granted but are to be appreciated and understood.

Background:

Geology is the study of the way the Earth is put together. Geologists are scientists who study the Earth's structure, history and forces. The Earth is one of nine planets in the solar system that travels around the sun. The sun is a star that gives heat and light to the Earth. The Earth has water and air and it is the only known planet that can sustain life. The Earth is 4.6 billion years old. It is made up of four different layers. The outer layer is called the crust. We live on the surface of the Earth. Weather and land movement cause changes in the surface of the Earth. The crust is made up of plates of rocks that move very slowly over long periods of time. The movement of these plates form mountains, valleys, and canyons. This movement also causes volcanoes and earthquakes. The crust range from 3.1 miles thick under parts of the ocean floor to 24.8 miles thick under land.

The mantle is the second layer. It is 1,800 miles thick. It begins as a solid rock, but as it goes deeper, it becomes so hot that the rock melts and becomes molten. The rock in this layer is made up of iron and magnesium.

The third layer is the outer core made up of hot liquid iron and nickel. It is about 1,200 miles thick.

The inner core is the fourth layer and the center of Earth. It is made up of a solid ball of iron and nickel about 1,500 miles across (Butterfield, 1992).

PREPARING STUDENTS FOR GEOLOGY AWARENESS

Week 3, Activity 1

How Old is the Earth?

Objective:

1. To help students understand that the evolution of the Earth took place over millions of years and that people are only a small part of its existence.

Subject Areas: Science and math

Background: The Earth is 4.6 billion years old. One theory is that the Earth began as a collection of dust particles that formed together making the Earth and the other planets of the solar system. The Earth began as a red hot rock but after a billion years it cooled and formed oceans. It is in the ocean that the first forms of life developed (Butterfield, 1992).

Preparing:

1. Begin by asking the questions about the Earth. (See "Questions About the Earth and What We Know.") Record students' answers (use worksheet as a overhead). Save their answers until the end of the unit to compare what they know now with their understanding after completing the unit.
2. Review the concept of the Earth and how we are dependent on its resources. Tell students that we are going to study the formation of the Earth and its makeup. Ask students if they know what a geologist is? Explain to the students that this week we will become geologists and study the Earth.

Questions About the Earth
and What We Know

1. What is geology?

2. What is the Earth?

3. How old is the Earth? _____.

4. How does the Earth travel?

5. What is the sun?

6. What does the Earth look like inside?

Week 3, Activity 1 Continued

How Old is the Earth?

Materials:

1. Adding machine tape
2. Pencils
3. Colored pencils or markers
4. A partner
5. Tape measure
6. Masking tape
7. Pictures of volcanoes, earthquakes, single cell organisms, simple plant and animal life, dinosaurs and prehistoric animals
8. The book: How Much is a Million? by David Schwartz, 1985

Procedure:

1. Tell the students that they will be making a timeline to help them picture and understand how old the Earth is. (See sample of timeline at end of activity.)
2. Have students choose a partner.
3. One student of the pair will measure the other student beginning with the right index finger to the end of the left index finger. This is done with both arms extended out from the side. A tape measure is used to measure this length.
4. After this measurement has been taken the students will cut a piece of adding machine tape the length measured.
5. Tape the adding machine tape to the student who was last measured. Locate the following body parts:
 - a. right elbow
 - b. middle of left forearm
 - c. knuckle of left index finger
 - d. last joint of left index finger
 - e. tip of finger
 - f. snip of nailMark each body part on the adding machine tape. Use different colored pencils for each mark made.
6. Take the strip off the measured person and lay it flat on a table or solid surface (big pieces of flat cardboard work well if working on the floor).
7. Labeling important events in time.
 - a. Tell the students at the right index finger, which is the beginning of their tape strip, represents the beginning of the Earth. Have them label it **Beginning of Earth** on their strip.
 - b. From the beginning of the right index finger to the right elbow the Earth was forming with many earthquakes and volcanic

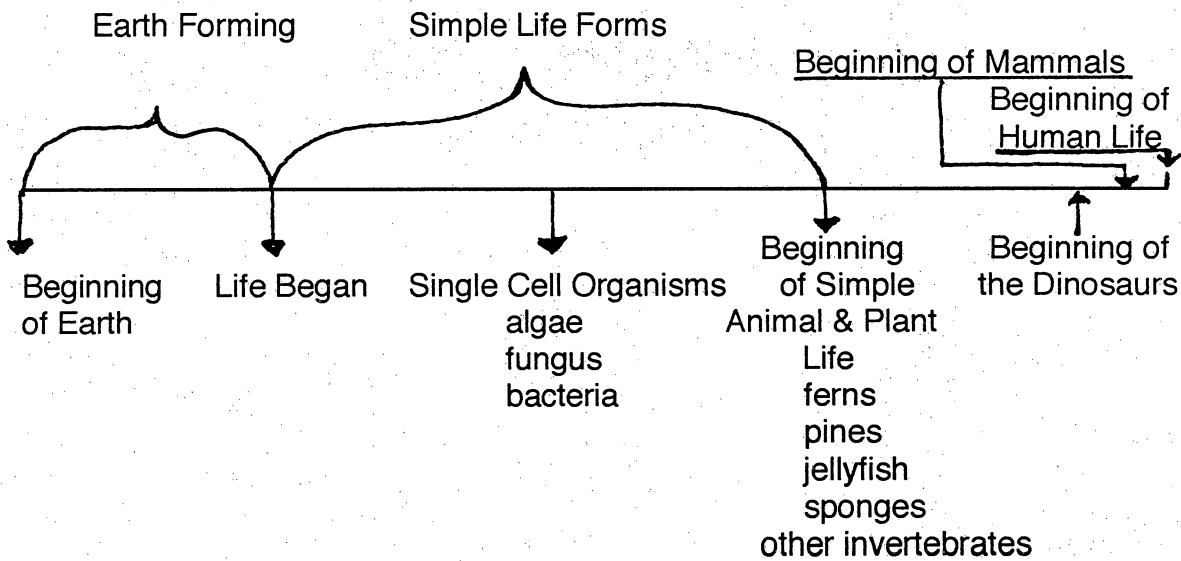
activities going on. Label this section **Earth Forms**. This would be a good time to show pictures of earthquakes and volcanoes.

- c. Label the right elbow measurement **Life Began**. In this section have students label it **Simple Life Forms**. Explain to students that from the right elbow to the middle of the left forearm was the development of the single cell organisms such as **algae, fungus, and bacteria**. This is a good time to show pictures of these single life forms. Have students label the simple life forms under its heading, **Single Cell Organisms**.
- d. Label the middle of the left forearm measurement **Beginning of Simple Plant and Animal Life**. Explain to students that the **plant life** at this time consisted of **ferns** and **pines**. The **animal life** consisted of **jellyfish, sponges** and **invertebrates** (animals without backbones). At this point you may want to explain the differences between invertebrates (animals without backbones) and vertebrates (animals with backbones). Pictures should be shown of these animals and plants. Have students write the names of the plants and animal life that existed at this time under the heading **Beginning of Simple Animals & Plants**.
- e. The next measurement, which is the left knuckle of the left index finger, should be labeled the **Beginning of the Dinosaurs**. Explain to students that the dinosaurs lived from this point to the next measurement, which is the last joint of the left finger. Books with illustrations of dinosaurs can be shown.
- f. At the the last joint measurement label it the **Beginning of Mammals**. Explain to students that animals such as the Great Woolly Mammoth and the Saber Tooth Tiger lived during this time. This would be a good time to show students pictures of prehistoric animals. These animals lived until the end of the fingertip, which is the second to the last measurement.
- g. Label the tip of the finger **Beginning of Human Life**. The snip to the nail indicates how long human beings have been on this Earth. Explain that all dinosaurs were already extinct when humans appeared.
- h. After all the parts have been labeled it would be a good idea to review the important events in time. Students should illustrate the major events using markers or colored pencils.
- i. Ask students how much time they think this timeline shows. Explain to them that it shows 4.6 billion years and that the

Earth is 4.6 billion years old. Have students write on the back of their timeline that the Earth is 4.6 billion years old.

- j. This timeline gives a clear view of how long human beings have been on the Earth. Ask students how long human beings have been on the Earth, in comparison to the age of the Earth. They should come to the conclusion that the Earth is much older than the human beings who inhabit it, and that humans are only a small part of the Earth's existence. Another good concept to point out is that the Earth has taken billions of years to get the way it looks today. In order for students to understand the concept of a billion, read How Much is Million?
- k. The timelines can be posted around the room.

SAMPLE OF TIMELINE



Week 3, Activity 2 Earth in the Solar System

Objective:

1. To help students discover where the Earth is in our solar system.

Subject Areas: Science

Background: The Earth is a one of nine planets in the solar system. It travels clockwise around the sun as it spins counterclockwise on its axis. Its axis is an imaginary line that passes through the center of the planet from the north pole to the south pole. The Earth is the fifth largest planet in the solar system but it is small compared to the sun (Butterfield, 1992).

Preparing:

1. Explain to students that the Earth is one of nine planets that travel around the sun through space. It is part of the solar system.
Questions to ask students:
 - a. What is the solar system? (The solar system is a group of nine planets that travel around the sun.)
 - b. How long does it take the Earth to go around the sun? (One year.)
 - c. Which is bigger - the Earth or the sun? (The sun.) To illustrate this, bring a big yellow beach ball and a pea. Tell student that the beach ball represents the sun and the green pea represents the Earth.

Materials:

1. Green small round balloon
2. Yellow large round balloon
3. Yellow beach ball
4. One green pea
3. Tape
4. Yardstick
5. String
6. Flashlight

Procedure

1. Blow up a large yellow balloon to represent the sun and a smaller green balloon to represent the Earth. Tape the yellow balloon to one end of the yardstick and hang the green balloon by a short string to the other end of yardstick.
2. Have a student stand and hold the sun side of the yardstick and turn slowly in place clockwise to show how the Earth travels. Explain that the Earth also spins on its own axis as it travels

around the sun counterclockwise. Explain that the axis is an imaginary line through the Earth that goes from one pole to another. As the student turns in place, swipe at the green balloon so that it goes counterclockwise showing the spinning motion.

4. Ask the students which is completed more quickly - the Earth's revolution around the sun or the Earth's rotation? The students should be able to see that it takes longer for the Earth to revolve around the sun than to rotate. Tell the class that it takes the Earth 24 hours for the Earth to rotate compared to one year for the Earth to complete one revolution around the sun.
5. Ask the class why we have day and night? Have the student who is holding the yellow balloon side of the yardstick also hold a large flashlight. Turn the classroom lights off. Turn the flashlight on. The student shines the flashlight on the Earth while you spin the Earth. The students can see that when the Earth turns towards the sun, it is daylight; and when it turns away from the sun, it is night.

Week 3, Activity 3

Layers of the Earth

Objective:

1. To discover what the Earth consists of.

Subject Areas: Science, geology, and language arts

Background: The Earth is made up of four layers: the crust, the mantle, the outer core and the inner core. Each layer is characterized by its own unique materials. The crust is made of granite, the mantle is made of basalt, the outer core is made of rock and iron, and the inner core is a solid ball of iron (Butterfield, 1992).

Preparing:

1. Take the students out to the dirt or grassy part of the playground. Bring in a shovel and show it to the students. Ask students if they could dig a hole to the other side of the Earth? (Accept all answers.)
2. Tell students that we will not dig a hole now, but if we did, what would we find along the way and how long would it take to dig to the other side?
3. Tell students: "Let's find out."

Materials:

1. A shovel
2. 8 roundish avocados
3. Tortilla chips
4. Sour cream
5. A large bowl
6. A fork
7. 1 knife
8. An avocado pit that has dried for one day
9. The book: How to Dig a Hole to the Other Side of the World by Faith McNulty, 1979.

Procedure:

1. Have the students sit down on the grass and tell them that since we are geologist we need to discover what the Earth is made of.
2. Show students an avocado and tell the students that this avocado represents the Earth. The Earth is covered with land and water. The land contains soil and rocks. The skin of the avocado represents the crust. The crust is made up of granite.
3. Peel off the skin and show students the meat of the avocado. Tell students that this represents the layer called the mantle of the

Earth. Ask the students if they would like to try some Mantle Dip with Crust. Tell them after we are done with this activity we can try some. Explain to the students that the mantle is very hot and made of basalt. It is 1700 miles thick. As you go deeper, the basalt will melt. This is called magma. This magma turns to lava when it reaches the top of the ground through the cracks. This is how volcanoes are formed.

4. Cut the meat of the avocado off. Show the students the pit of the avocado. Tell students that this is the outer core. The outer core is made of a mixture of rock and iron. It is 1300 miles thick.
5. Show students a pit that was left out to dry for a day. The skin should easily peel off. Inside is the inner core. Explain to students that the inner core is so hot that it glows white. It is a ball of solid iron. It is 1500 miles thick.
6. Now that the students know what the Earth is made of and the distances they would have to travel, ask them if they would like to dig to the other end of the Earth?
7. Return to class to make Mantle Dip with Crust, using the following recipe:

Mash eight avocados. Add a pint of sour cream. Mix until it is smooth. Serve with tortilla chips which represent the Earth's crust plates.

8. After students munch on the Mantle Dip and Crust, read the story How to Dig a Hole to the Other Side of the World. While the story is being read, stop at designated places to see if the students can fill in the appropriate information. Places to stop in text:
pg. 8 - "This is the rocky skin of the Earth, called the (crust). It is mostly (granite)."
pg. 15 - "Keep drilling for ten to twenty miles. You will come to kind of rock called (basalt)." "Melted basalt is called (magma)."
pg. 16 - "When it cools on top of the ground, it is called (lava)."
pg. 18 - "When you have gone down about a hundred and fifty miles, you are in what is called the (mantle) of the Earth."
pg. 19 - "The mantle is made of (basalt) that is melted into goo and at the same time is harder than steel."
pg. 21 - "The mantle is (1700) miles thick."
pg. 24 - "Now you must go through what is called the (outer core) of the Earth. It is a mixture of melted rock and (iron). It is (1300) miles thick." "After the outer core comes the (inner core). The inner core of the Earth is a ball of solid (iron). It is so hot it glows with (white) light."

Week 3, Activity 4

Earth Layers Project From Inside Out

Objective:

1. To assess students' understanding and concept of the composition of the Earth .

Subject Areas: Science, language arts, and creative arts

Preparing:

1. Read How to Dig a Hole to the Other Side of the World by Faith McNulty for a second time. Leave out the key words as was done in the previous activity.
2. Ask students to name the different layers of the Earth.

Materials:

1. Large bowl
2. Flour
3. Salt
4. Food coloring: yellow, orange, red, brown
5. Water
6. Plastic Ziplock gallon size bags
7. Large cans
8. Plastic knives for students or one regular knife for teacher use only

Procedure:

1. Prepare different colored clay and store in large Ziplock bags. Divide the class into nine groups. Three groups will make brown and red clay. Two groups will make orange and one group will make yellow clay. You will need to make three batches of brown, three batches of red, two batches of orange and one batch of yellow. Use the directions below for each batch.
2. Mix together in a large bowl the following ingredients:
 - 3 cups of flour
 - 1 cup salt
 - 2 tablespoons oil
 - 1 cup colored water
3. Give each student a small piece of yellow clay. Tell students to roll it into a ball the size of a marble. While students are rolling the clay tell them that this yellow ball of clay represents the inner core of the Earth. It is a ball of solid iron. It is so hot that it glows like a white light.

4. Give each student some orange clay. They need to flatten a thin piece of orange clay to go over the yellow inner core. Large cans can be used to roll out the clay. While students are flattening the clay explain to students that they are making the outer core of the Earth. From the story that was read, remind students that it is made up of a mixture of melted rock and iron and it is 1,300 miles thick.
5. Give each student some red clay. Students will need a larger piece of clay to make the mantle. Again, have the students roll the clay out with the cans. Have them make it thick and put it over the outer core. Remind students that it is made of basalt that is melted into goo and at the same time harder than steel. The heat melts it and the weight above it presses it down to make it hard.
6. Give each student some brown clay. Students will need a piece big enough to go over the mantle. Students will need to flatten this piece too. Remind students that this rocky skin is called the crust. It is mostly made of granite.
7. With a plastic knife cut a quarter piece out of the clay Earth exposing the different layers of the Earth. (Teacher may want to do this part with a real knife to get a clean cut.)
8. Students can work on worksheet, "**A Journey Through the Earth,**" using the word bank.

Geologist's name _____

A Journey Through the Earth

The rock skin of the Earth is called _____. It is mostly made up of _____. In some places on Earth, hot water bubbles up in springs, or shoots up in _____. As you dig deeper into the Earth you come to a kind of rock called _____. It is black, hard, smooth and heavy. Going deeper, the basalt will get hotter and hotter. It will melt. Melted basalt is called _____. This stuff sometimes shoots out cracks in the Earth and makes _____. When it cools on top of the ground, it is called _____. The next layer of the Earth is called the _____. It is made of basalt that is melted into goo and, at the same time, is harder than steel. It is _____ miles thick. The third layer of the Earth is called the _____. It is a mixture of _____ and _____. It is _____ miles thick. The last layer of the Earth is called the _____. It is a ball of solid _____. It is so hot it glows with a _____ light.

Congratulations! You have just completed your journey through the Earth!

Word Bank

mantle	basalt	geysers	1700
inner core	granite	volcanoes	1300
crust	iron	magma	white
outer core	rock and iron	lava	

Week 4, Activity 5 Plate Tectonics

Objectives:

1. To simulate the plates of the Earth and be able to explain how they move.
2. To show how the Earth has changed.
3. To understand that the Earth is constantly changing over a long period of time.

Subject Areas: Science, geography, social studies.

Background: The crust of the Earth is divided into plates. These plates move very slowly on top of the hot mantle of the Earth. These plates collide creating mountains, trenches, and volcanoes. They slide causing earthquakes and they move apart making the ocean floor split allowing molten rock to escape through the cracks. The land on the Earth is divided into seven continents or plates. The Plate Tectonics theory purports that these continents were not always separated as they are today. Two hundred million years ago, all the continents were united. The rest of the Earth was one huge ocean. The land mass began to move apart slowly, creating the oceans and the seven continents that are present today. It has taken millions of years for this separation. This movement of the Earth's crust, driven by heat forces within the Earth, is called Plate Tectonics (Butterfield, 1992).

Preparing:

1. Ask students what they know about the crust of the Earth.
2. Tell students that the crust of the Earth is divided up into plates that are constantly moving.

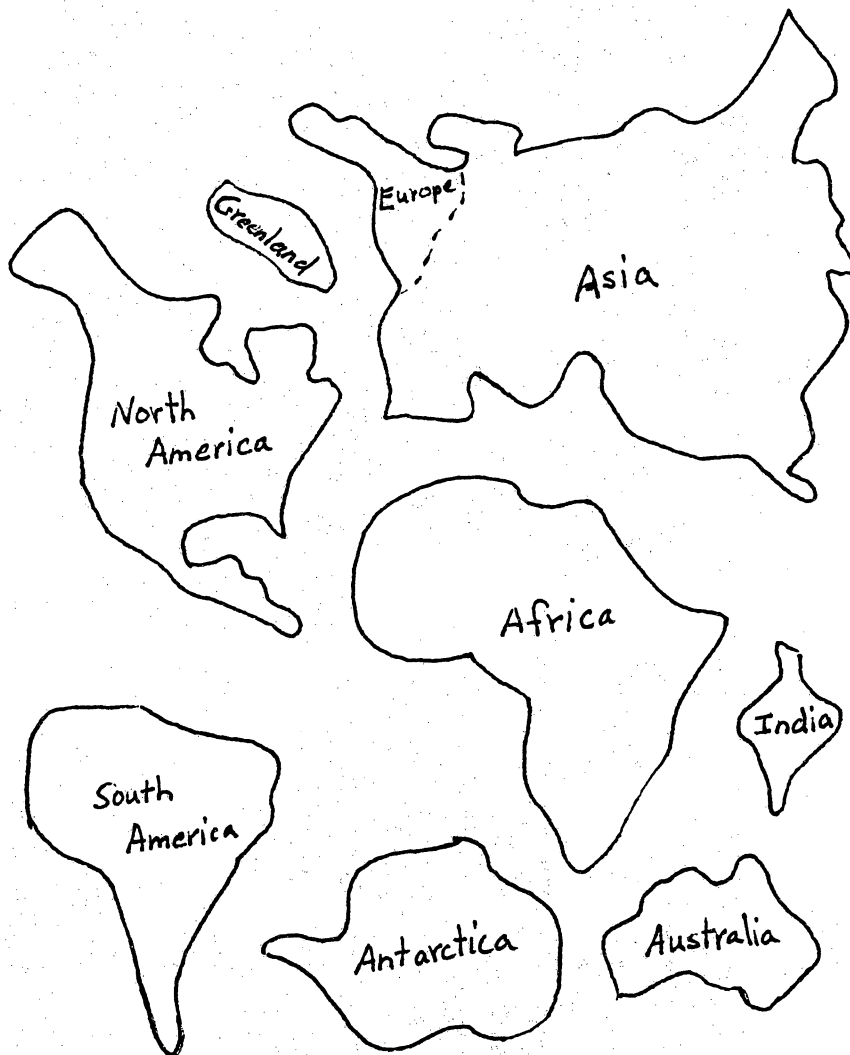
Materials:

1. Overhead with the seven continents cut apart
2. Saltine crackers (Manischewitz Passover Matzos work best)
3. Ziplock sandwich bags

Procedure:

1. Break up crackers into large pieces (two breaks for small crackers; five breaks for larger crackers). Put the broken crackers into a bag.
2. Give each group of students a plastic bag with the cracker pieces in it.
3. Ask students to carefully put the cracker together without breaking it. They must work gingerly.
4. After students successfully put the cracker together, tell them that the Earth's crust has plates that fit together like a jigsaw puzzle. This is known because geologists have measured the edges of

the land around the world and found that they all fit together like the pieces of the cracker. Explain to students that our Earth has seven pieces of land called continents (show students an overhead of the seven continents). Explain to students that these continents used to be connected together; but, slowly, through millions of years, they split into seven pieces (the overhead transparency can be cut into seven continents). By sliding the pieces together and apart the students can see how the continents fit together and moved apart. Explain to students that the movement of the Earth's crust is driven by heat forces within the Earth is call Plate Tectonics.



Week 4, Activity 6 Rocks Investigation

Objective:

1. To encourage students' awareness and appreciation of rocks.
2. To reflect and share students' connectiveness with rocks.

Subject Areas: Language arts, oral and written expression.

Background: Children have an intrinsic interest in rocks. They often take a keen interest in collecting rocks of all sizes, shapes, and colors. Some children have even named their rocks after their location, color, or shape. Teachers need to encourage this interest in the Earth.

Preparing:

1. Ask students if anyone has ever had a rock collection? Let the students share their experiences.
2. Invite a student or another person who has a rock collection to share it with the class.

Materials:

1. Everybody Needs A Rock by Byrd Baylor, 1974
2. A student or other person who can share their rock collection
3. Large tablet paper or white butcher paper
4. Worksheet for each student

Procedure:

1. Read to the class, Everybody Needs A Rock.
2. After reading the book, work with the students to remember the ten rules for finding rocks. Write these rules on large tablet paper to post in the room. Ask your class if they can add some more rules to this list?
3. Using the rules, students will go outside to find a rock.
4. The worksheet on the next page should be completed by each student. This worksheet will help students summarize their thoughts about their rocks on their final paper which will be shared with the class. Their reports and rocks can be displayed around the classroom for others to read.

Rules for Finding a Rock

1. If you can't go to a mountain made out of rocks, anyplace will do.
2. Choose a rock when everything is quiet.
3. Look a rock right in the eye.
4. Don't choose a rock that is too big.
5. Don't choose a rock that is too small.
6. The size must be perfect. It feels easy in your hand when you close your fingers over it. It feels jumpy in your pocket when you run.
7. Look for the perfect color. A way to see color is to dip your rock in a water.
8. The shape of the rock is up to you. If your rock is going to be special it should look good by itself in the bathtub.
9. Always sniff a rock.
10. Don't ask anybody to help you choose.

Byrd Baylor

Geologist's
Name _____

1. Where did you find your rock? _____

2. The size of your rock is the same size as a _____

3. What is the color of your rock? _____

4. Describe the shape of your rock. _____

5. What does your rock smell like? _____

6. What made you choose your rock? _____

**Recommended Resource Books
For Geology Lessons,
Thematic, Unit 2:**

Atwater, Baptiste, Daniel, Hackett, Moyer, Takemoto, & Wilson.
Earth Beneath Your Feet
Macmillan/McGraw-Hill Science, 1993

Beiser, Arthur. **The Earth**
Time Inc., 1971

Butterfield, Miroa. **1000 Facts About The Earth**
Scholastic, Inc., 1992

Cohen, Laura. **Our Earth**
Frank Schaffler Publications, 1991

Darling, Dr. David. **Could You Ever Dig a Hole to China?**
Dillon Press, Inc., 1990

Symes, Dr. R.F.. **Rocks & Minerals**
Dorling Kindersley Book, 1988

**Recommended Literature Books
For Geology Lessons
Thematic Unit 2**

Baylor, Byrd. **Everyone Needs A Rock**
Macmillan Publishing Co., 1974

Cole, Joanna. **The Magic School Bus Inside The Earth**
Scholastic, 1987

McNulty, Faith. **How to Dig a Hole to the Other Side of the World**
Scholastic Inc., 1979

Schwartz, David. **How Much Is a Million?**
Scholastic, 1985

Zoehfeld, Kathleen. **How Mountains Are Made**
Harper Collins Publishers, 1995

Thematic Unit 3

Topic: DIVERSITY, ADAPTATION, AND INTERDEPENDENCE OF THE EARTH

Environmental Concept: All living things that inhabit the Earth are dependent upon each other and their environment. They are interdependent with their natural and physical environment.

Background:

All elements of the Earth and its inhabitants are directly or indirectly connected in some way with one other. The word ecosystem relates to how plants and animals interact with each other and their environment. The non-living factors of the Earth play an important role in the survival of plants and animals. These non-living factors are land, atmosphere, water, and sun (L.A.W.S.). The sun gives energy to the plants so they can make their own food. This process is called photosynthesis. The plants are called the primary producers. They provide food for the animals that live on the Earth. Animals are the primary consumers. They consume the food of the primary producers. The type of plants and animals that live on the Earth depend on the non-living factors around them. The kinds of plants and animals that live in a certain area are governed by the types of soil, the moisture in the air, the amount of water and sun in the area. Areas of land, such as the mountains, ocean, desert, and prairies support different ecosystems, made up of diverse groups of plant and animal life. Each diverse group of plants and animals are uniquely adapted for the environment that they inhabit (American Forest Foundation, 1993).

PREPARING STUDENTS FOR ENVIRONMENTAL STUDIES

Week 5, Activity 1: Making Nature Journals

Objective:

1. To learn that certain tools will be needed to develop observation skills.
2. To develop tools for reflected experiences.

Subject Areas: Creative art, environmental studies, and language arts.

Background: Actual involvement in learning improves learning experiences. It empowers students so they can make a difference by their actions. But in order for learning opportunities to become more meaningful, it is important to help students learn to reflect upon their experiences. Reflection is based on experiences that the learner has analyzed and explored to develop new understanding and significance to one's situation or life (Knapp, 1992).

Preparing:

1. Tell students that we have just finished a unit on geology in which we became geologists and learned about the structure and composition of the Earth. We studied about the Native Americans, who respected and cherished the Earth. Now, we will learn more about the Earth and understand how it can sustain life.
2. Tell students that for the next several weeks they will be learning to observe their environment more closely. In order to record such observations they will need to make a journal.
3. Explain to students that writing in a journal will help them organize their thoughts and develop an understanding of what they are observing and learning. This process is called reflection.
4. Ask students the meaning of unique? Tell students that their journals will be a unique representation of their natural environment.
5. Review with students the definition of natural. Tell the students that they will be decorating their journal with natural materials found outdoors.
6. Ask students what materials might be collected for this representation. Natural materials would be light weight, small, and interesting.
7. Let the students press the natural materials; leaves, seeds, and feathers by placing them in wax paper and leaving them between the pages of books for a couple of days.

Materials:

1. Journal, notebook, or lined paper with construction paper cover, stapling the pages together as a notebook.
2. Clear contact paper
3. Collected and pressed small-sized leaves and plants.
4. Pencils, pens, markers

Procedure:

1. Students can either make a journal using notebook paper or use the notebook journals already made.
2. On the cover of their journals have them clearly write their name using a marker. Have them label the title of their journals: **Reflecting To Learn.**
3. Cut a piece of clear contact paper to fit most the cover of their journal. Students need to arrange the natural materials collected on the sticky side of the contact paper. Then the contact paper can be placed over the cover.
4. Journals will be used throughout the entire of the program.
5. The first entry can be about their experience of collecting the natural materials and why they chose those materials.

Week 5, Activity 2: Diversity and Adaptation in Our Environment

Objectives:

1. To explore the diversity of living things and their environment.
2. To assess students' understanding of diversity.

Subject Areas: geography, science, and creative arts

Background: The Earth is the only known planet that can sustain life. The non-living factors (land, atmosphere, water and the sun) contribute to all things that live on this planet. If the non-living factors in a particular area change so does the type of plants and animals that live in the area (American Forest Foundation, 1993).

Preparing:

1. Read the four books listed under "materials" to the students. After each book is read, make a list of the types of plants and animals that live in the different areas on large tablet paper. Spend some time talking about the special adaptations that help plants and animals survive in their environment.

Materials:

1. Arnold, Caroline. A Walk In The Woods
Silver Press, 1990
A Walk in the Woods take the reader through the forest and visits the plants and animals that live there. The forest changes with each new season.
2. Arnold, Caroline. A Walk Up The Mountain
Silver Press, 1990
A Walk Up The Mountain takes the reader up a mountain to see the plants and animals that live there. Your senses will be stimulated as you climb and learn about the geographic features of the mountains. You will experience mountain climbing as an expert and a novice.
3. Arnold, Caroline. A Walk In the Desert
Silver Press, 1990
A Walk In the Desert takes the reader through the desert to see the plants and animal that live there. The reader will experience the heat of the sun and the dryness of the Earth. An understanding of how plants and animals are adapted to this tough environment will begin to develop.
4. Arnold, Caroline. A Walk By The Seashore
Silver Press, 1990
A Walk By The Seashore takes the reader on a walk along the

seashore to witness the sand, waves, plants, and animals that live there. The reader's senses are aroused as the sand is felt squishing between the toes and the waves heard splashing against the shore giving that salty air smell to one's nostrils.

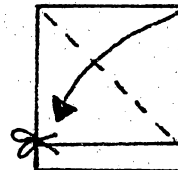
5. Large tablet paper for whole group activities
6. Pencils, markers, crayons, color pencils
7. Four pieces of large butcher paper 3'x 3'
8. Different colored scrapes of construction paper.

Procedure:

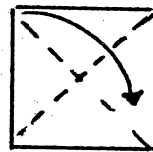
1. Assign each group of students an area of land; woods, mountains, desert, seashore.
2. Using white, 3'x3' butcher paper, have students color the background of their area of land. Show students how to make a large Triarama. (See How to Make a Triarama.) Each group of students will make a large Triarama illustrating the plants and animals that live in their assigned area. Students should refer to the list they made as a whole group.
3. Have them each write about their contribution to their group's Triarama and write about a special adaptation by a plant or animal.
4. The Triarama from each of the four groups will be put together to make a square of triangles displaying the four areas of land and their diversities. The written work can be typed and displayed as well.

How to Make a Triarama

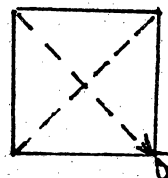
1. Fold right corner down to lower left to form a triangle.



2. Open and fold left corner down. Open.



3. Cut one fold line to center of square.



4. Overlap 2 triangles and glue to form triarama.



Week 5, Activity 3: Taking a Closer Look at the Diversity Around Us

Objectives:

1. To understand how non-living factors contribute to the type of plants and animals found in the area.
2. To find out what type of land students occupy.

Subject Areas: Science, geography and language arts

Background: Plants and animals that live in a particular area depend on the non-living factors: the land, atmosphere, water, and the sun. When the non-living factors change, so do the plants and animals that live in the area (PLT, 1993).

Preparing:

1. Before starting this activity, the teacher should do some research to find out what type of land surrounds the school. It might be a combination of two or three types of land. It might not be so clear-cut as the seashore or desert.
2. Tell students that we have learned about some areas of land on Earth. Ask them what type of land they think surrounds their school (accept all answers).
3. Tell the students that we will be taking a walk around the land in the immediate area of our school to study the animal and plant life. (Try to find a natural, undeveloped piece of land to observe.)

Materials:

1. Journals
2. Pencils
3. Large tablet paper

Procedure:

1. Students will begin using their journal today. Students will take a walk to an undeveloped piece of land. They will record the animals and plants that they hear and see. They will also study the contours of the land around them and try to figure out what type of land surrounds their school yard.
2. After students have had time to observe, listen, and develop their list of plants and animals, come together in a circle outside and allow each student to share his/her list. Each list will be compiled into a class list to be used later. In their journal, ask students to write the type of land that surrounds the school and the evidence that supports their conclusion. The students will share their

answers while the teacher takes notes.

3. After returning to class, review the list of animals and plants discovered in the area.
4. Using students' observations combined with the teacher's researched information, explain to students what makes this area the type of land it is.
5. Tell students that we can see that the land on Earth is not all the same; the land is diverse.
6. Ask students what makes this diversity of land around the world. Remind students of the popcorn seed we grew while studying about Native Americans. Ask students what the seed needed to live? Help students come up with the answers, water, sun, air, and land. Explain to students that these four things are the non-living factors that contribute to life on Earth. We call these the L.A.W.S. of the Earth. Write the following on a chart:
 - L = Land
 - A = Atmosphere
 - W = Water
 - S = Sun
7. Ask students to predict what would happen if L.A.W.S. changed in our area? That is, the land around our school became more ridged and grooved, the air more humid, the rainfall increased greatly and the sunshine decreased. Or, what if the land became flatter, the air drier, there was no rainfall in over 5 years and the temperatures were over 100° six months out of the year? Help students understand that when the L.A.W.S. change so do the plants and animals that live there. Factors, such as changes in the land and soil composition, drier or moister atmosphere, increases or decreases in rainfall, and less of more concentrated sunlight are non-living factors that contribute to the appearance, or disappearance, of plant and animals that inhabit an area.

Week 5, Activity 4: Adaptations of Animals

Objective:

1. To observe adaptations of animal life.

Subject Areas: Science and language arts

Background: Tadpoles are at the egg stage for 10 days. At the fifth to sixth week, the back legs become evident. After eight to ten weeks, the front legs emerge. The tail shortens and in approximately 15 weeks, the tadpole becomes a frog. The process of change from the egg to the tadpole to the frog is slow; therefore, it is recommended that you begin with tadpoles that are four to five weeks old (Cohen & Tunick, 1993).

Preparing:

1. Set up a mini-habitat. Get some pond water and put it in an aquarium. Add some tadpoles about three to four weeks of age (See Resources.) Add some tadpole eggs to the aquarium. Add some small aquarium plants to give tadpoles a place to hide and to add oxygen to their environment. Bloodworms or creamed spinach are recommended foods for young tadpole but algae is their natural food source. Putting plants in the aquarium will help accumulate algae. Bloodworms are available at pet stores (Cohen & Tunick, 1993).

Materials:

1. A tadpole mini-habitat
2. Journals
3. Tadpoles
4. Reference materials such as pictures, posters, and books
5. Hurlock, Fiona. Gorf's Pond

Brimax Books Ltd, 1996

A tadpole named Gorf is very lonely in his pond and would like to visit a pond across the way where there is more activity and animal life. As he waits in his pond he begins to change into a frog.

However, he still believes himself to be a fish and is surprised when he looks at his reflection in the pond.

Procedure:

1. Students can draw and write in their journals any changes that they see in the tadpoles.
2. Set out reference books to help students learn by reading and comparing. Let students predict what they are observing. Let students write and draw their prediction in their journal. These

- predictions will be compared with the actual process they are observing and recording.
3. Read the story, Gorf's Pond.
 4. After reading the story, ask students to recall the stages of growth of Gorf, the tadpole.
 5. In their journals, write about and draw the different stages of a tadpole to frog.
 6. Feed bloodworms to the tadpoles so that students can observe them feeding.
 7. This activity will takes weeks of observations and recording in their journal.

Resources:

1. Insect Lore Products
P.O. Box 1535
Shafter, CA 93263
(800 Live Bug)
(805 746-6047)
Contact this nature supply company for information on obtaining tadpoles, support materials, and books.
2. Early Childhood Curriculum:
Richard Cohen & Betty Phillips Tunick
Snails Trails and Tadpole Tails
Nature Education for Young Children
Redleaf Press, 1993

Week 5, Activity 5:

Adaptations of Plants

Objectives:

1. To learn the life cycle of a plant.
2. To understanding how living things are affected by their environment.
3. To learn adaptations of plants.
4. To discover how seeds are dispersed and how they travel.

Subject Area: Science and language arts

Background: Seeds are nature's way of reproducing plants. Plants that are pollinated produce seeds which germinate and grow into a plant if the environmental conditions are right. In order to disperse seeds far and wide most seed-bearing plants have developed unique ways of dispersal. Some seeds are light with wings or fuzzy parachutes which sail in the wind. Others have spines, hooks, or gooey coatings that attach themselves on animals or people. Some seeds are eaten by animals and deposited in other areas when the animal defecates. There are even seeds that shoot out from the parent plant (PLT, 1993).

Preparing:

1. Begin by asking the students the following discussion questions:
 - a. What is a seed?
 - b. Do seeds travel? If so, how?
 - c. What so seeds look like?
 - d. Where do they come from?
 - e. What do seeds turn into?
 - f. What do seeds need in order to grow?

Materials:

1. Old socks or old nylons stuffed with paper with string attached
2. Carle, Eric. The Tiny Seed
Picture Book Studio, 1987
3. Paper and other recycled materials student request in the design of their seed.

Procedure:

1. Collect seeds by walking across a field with socks worn over the student's shoes or by dragging a nylon stuffed with paper and attached to a string. Have students collect seeds they find at home.
2. Look at the seeds collected. Discuss how each type of seed is built or adapted for growth. Discuss how its structure facilitates its

- dispersal or travel. Explain how seeds are dispersed, or carried, by various means; water, wind, animals, and people.
3. Read the story The Tiny Seed by Eric Carle. After reading ask the following questions:
 - a. What are some ways that seeds travel?
 - b. Why do they travel?
 - c. Where are the seeds going?
 - d. Do all seeds grow into plants?
 - e. What happens to some seeds on their journey?
 - f. Can a tiny seed grow?
 - g. In the story, how did the tiny size of the seed help it grow?
 - h. What do seeds need in order to grow?
 - i. Name some problems seeds may encounter that prevent their growth.
 4. Have students work in groups to design seeds out of paper and other recycled materials. Have them demonstrate how their particular seed is adapted to travel. Students should display their seed in class, labeling it with a descriptive name and writing a brief description of their design.
 5. Students can write a creative story about its travel.

Suggested Literature:

1. Cole, Joanne. The Magic School Bus Plants Seeds
Scholastic Inc., 1995
2. Jordan, Helene. How a Seed Grows
Harper Trophy Edition, 1992
3. Muller, Gerda. The Garden in the City
Dutton Children's Books, 1992

Week 6, Activity 6: The Balance of Nature

Objectives:

1. To develop awareness and respect for the environment.
2. To begin to develop the idea of interdependence of living things within their natural and physical environment.

Subject Areas: Language arts and social studies

Background: The Native American people understood the meaning of interdependence. They respected and cherished the Earth. In the 1500s, the Native Americans' land was invaded by people from other countries. Their land was taken from them and many tribes were completely destroyed by wars and epidemic diseases brought over by the Europeans. By 1881, there was only one quarter of a million Native Americans left to pass on their traditions, values and history (Thomas & Pendleton, 1995). As we study the life and ways of the Native American people, we begin to understand the interdependence that exists on the Earth.

Preparing:

1. Before reading, Brother Eagle, Sister Sky, tell the students that this book was adapted from a speech or letter by Chief Seattle in the mid-1850s. Explain to the students that the government of Washington, DC, wanted to buy the lands of Chief Seattle's people. Tell your students that this book contains a message. Ask students to listen for that important message.

Materials:

1. Jeffers, Susan, Brother Eagle, Sister Sky
Scholastic Inc., 1991
2. Journals

Procedure:

1. Read Brother Eagle, Sister Sky
2. Ask the following questions during or after reading:
 - a. How did Chief Seattle feel about the Earth?
 - b. How did he feel about... the plants? the animals? the rocky crests? meadows, ponies? the water that moves in the streams and rivers? the reflection in the clear waters of the lake? the water's murmur? the river? the air? the wind?
 - c. What is the next sentence that Chief Seattle said after he said: "The Earth does not belong to us."
 - d. What did Chief Seattle mean when he said, "The Earth is our mother."

- e. What does Chief Seattle mean when he said, "What will happen when the secret corner of the forest are heavy with the scent of many men?"
 - f. What does Chief Seattle say will happen when the buffalo are all slaughtered, the wild horse tamed, and the secret corners of the forest are heavy with the scent of many men?
3. Reread the story, without interruptions. After reading it for the second time, ask your students to interpret the message that Chief Seattle was proclaiming. Have them write their interpretations and reflections in their journals under the heading "A Message from Chief Seattle." Ask volunteers to share their interpretations.
 4. Copy this paragraph from the Brother Eagle, Sister Sky on the board or chart paper:

"All things are connected like the blood that unites us.
We did not weave the web of life,
We are merely a strand in it.
Whatever we do to the web, we do to ourselves."
 5. Discuss with your students their interpretation of this message. Students can then copy this message in their journal. Underneath the message they should write their interpretations and reflections.
 6. Ask students: By what we learned as a Native American researcher and a geologist, how are we connected to the Earth? Record their answers on the board. Students can copy one of the recorded answers that best explains their connection with the world in their journal.

Week 6, Activity 7: Interconnections in the Ecosystem

Objectives:

1. To predict the meaning of the balance of nature.
2. To discover how interdependence works in relationship to a food chain.
3. To take a closer look at our ecosystem and discover the interconnections.
4. To infer and identify interdependence between plants and animals that live in the immediate area of our school.
5. To begin to appreciate the role that all living things play in our environment.

Subject Areas: Environmental science, math and language arts,

Background: Ecosystems relate to how plants and animals interact with each other and their environment. It is the web of life. The most dominant plants and trees dictate the variety of plants and animals that live in the area; however, animals also play an important role in the system because some help pollinate flowers and disperse seeds. The main function of the ecosystem is to produce and distribute energy. Green plants take the energy from the sun and turn it into food for plant eaters. Meat eaters eat the plant eaters continuing the cycle. This web of life illustrates that all living things are connected in some way with each other (American Forest Foundation, 1993).

Preparing:

1. Ask students what is the definition of balance. Listen to their responses and then ask them what they think the balance of nature means. List their ideas on a large piece of tablet or butcher paper and save.
2. Take out the list students compiled of the animals and plants on their exploration in the activity under "Taking a Closer Look at the Diversity Around Us." Read the list together in class.
3. Brainstorm how to classify and categorize the items on the list such as categories of Animals (consumers), Plants (producers), and Animals' Homes.
4. Students can work in cooperative groups to organize and categorize the list. (See Organization Worksheet.)
5. Using their classifications, work as a whole group to complete a graphic organizer, such as a word web or Venn diagram. (See Word Webs and Venn Diagrams.)

Materials:

1. White butcher paper or large tablet chart paper
2. List compiled from the activity "Taking a Closer Look at the Diversity of Land and Animals Around Us."
3. Geraghty, Paul. Over The Steamy Swamp
Hutchinson Children's Books, 1988
This story clearly illustrates a type of food chain in the swamps.
4. Manson, Christopher. The Tree in the Wood
North/South Books, 1993
The Tree in the Wood is a classic folk song which illustrates the interrelationship we have with the rest of the natural world.

Procedure:

1. Read Over the Steamy Swamp by Paul Geraghty.
2. Ask students to summarize the story.
3. Discuss with students the definition of a food chain.
4. Draw a diagram of a food chain on the board as the students tell what ate what in the story.
5. Using the word webs and the Venn diagrams that were created in class, the students will work collaboratively to make food chains.
6. Ask students to compare each groups' food chain by sharing them in class.
7. Ask students if they see a balance in each food chain.
8. Cover one animal or plant on their food chain. Ask students what would happen if this particular animal was eliminated from the chain? Write down their responses on large tablet chart paper or butcher paper. Tell students that when an animal or plant disappears, this is called extinction. Students should begin to understand that when a plant disappears, animals that depend on it directly for food or shelter also suffer. In turn, species that depend on such animals are affected.
9. Ask students to look at the predications they made about their thoughts about the balance of nature to see if there are any changes that could be made, or any information they could add.
10. Write their edited version and new ideas about the balance of nature by summarizing it with the students.
11. Read The Tree In the Wood by Christopher Manson.
12. Ask cooperative groups to work together to illustrate a sequence of events that happen in the story showing the interrelationship we have with the rest of the nature world.
13. Ask them to eliminate one event. Tell them to be prepared to present to the class what happens when an event is eliminated.
14. Ask the class where we fit in this scheme of life. Help students conclude that since all life on the planet is interconnected, extinction will eventually affect all species on Earth one way or

other. Like all species, humans depend on others for survival. We need a variety of species to produce the oxygen we breathe, absorb the carbon dioxide we exhale, decompose our sewage, provide our food and maintain the fertility of our soil.

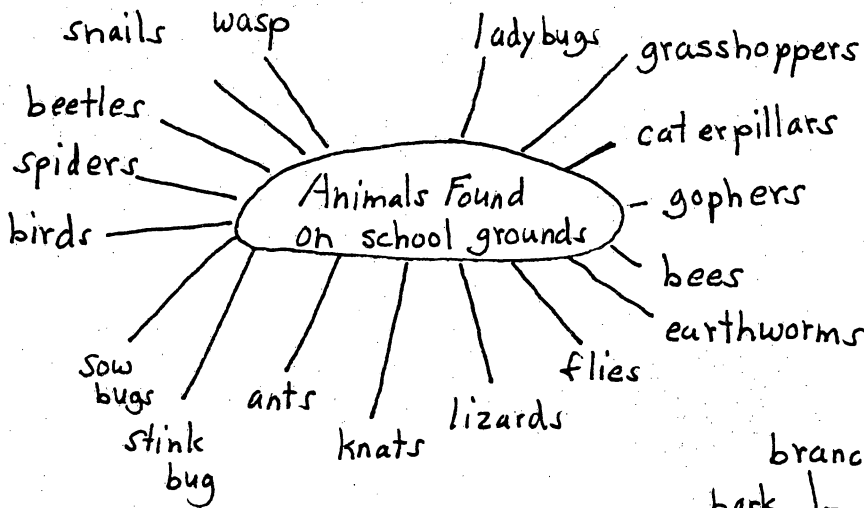
15. Ask students what they can do to help sustain the balance of nature. Tell students that there are local projects that schools can participate in to help wildlife and reduce the number of endangered species. One of the most important ways to help reduce the number of endangered species is for students to inform and educate others by word of mouth, letter-writing, making posters and bumper stickers, and staying informed about efforts to save wildlife.

Organization Worksheet

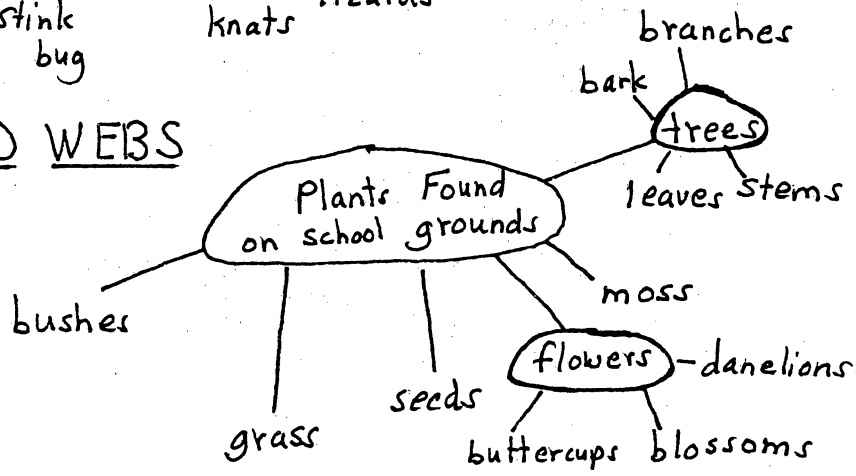
DIRECTIONS: Classify the items found on the school grounds by listing them under the correct heading.

Names:

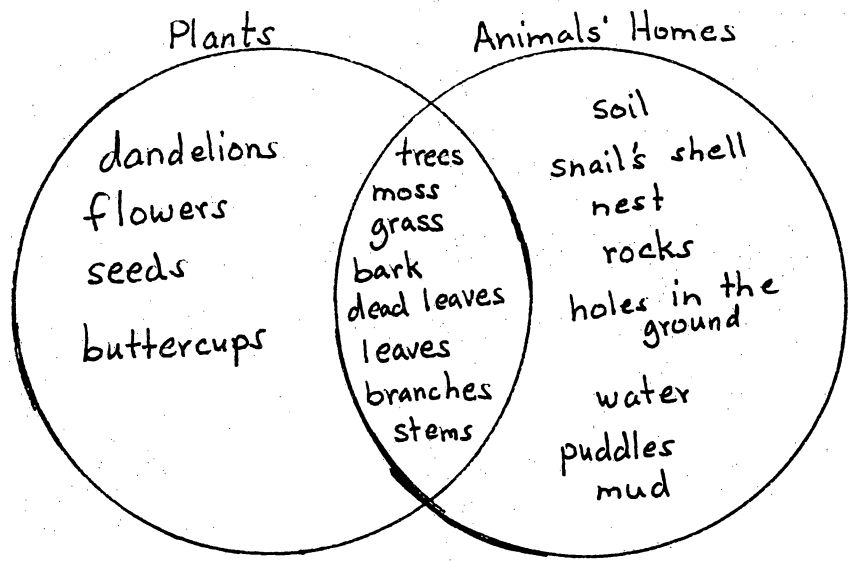
<u>Animals</u>	<u>Plants</u>	<u>Animals' Homes</u>



WORD WEBS



VENN DIAGRAM



Recommended Literature

Allsburg, Chris Van. **Just a Dream**

Houghton Mifflin, 1990

A boy named Walter has a dream about the Earth's future. It is devastated by pollution. After his dream he begins to understand the importances of taking care of his environment.

Baker, Jeannie. **Where The Forest Meets the Sea**

Greenwillow Books, 1987

A boy and his father take a trip to the rainforest. The boy learns information about the rainforest from his father but also explores the rainforest himself and imagines what it must have been like for the people living on the island long ago. At the end of the story the boy feels sad because he begins to wonder if the forest will still be there when he and his father come back.

Bash, Barbara. **Tree of Life**

Sierra Club Books and Company, 1989

This is a story of a tree's life cycle in the African Savannah and the important role it plays to the African people and to the animals that it supports.

Bellamy, David. **The River**

Scholastic Inc., 1988

The reader will learn to observe the balance of nature in and on the river. He or she will discover that the river is home to birds, fish, and plants that live on its banks and in its waters. The reader will also learn the devastating changes in the environment that can result when human-made disasters occur.

Cherry, Lynn. **The Great Kapok Tree**

Harcourt Brace Jovanovich, 1990

A young man begins chopping down a great Kapok Tree in the Amazon rainforest. While chopping he becomes tired and rests. As he rests animals that depend on the tree one by one whisper in his ear why he should not destroy their home. When the young man awakens he is surrounded by the animals as they wait for his decision.

Cowcher, Helen. **Rainforest**

Sunburst Ed., 1988

This book takes a look at some of the creatures that live in South American forests and illustrates the lush vegetation there. But one day the forest life is disrupted due to deforestation. The animals flee farther inward but wonder how long before there would not be a place to flee.

Peet, Bill. **The Wump World**

Houghton Mifflin Co., 1990

The Wumps live in a clean, beautiful world until the Pollutians discover their land and move in. With the arrival of the Pollutians, it is also the beginning of the destruction of the Wumps' land. Soon the land is so polluted that the Pollutians must leave to another planet leaving the land in a terrible mess for the Wumps to deal with.

Seuss, Dr.. **The Lorax**

Random House, 1971

The reader discovers the impact of human greed on the environment.

Turner, Ann. **Heron Street**

Scholastic, Inc., 1989

In the beginning many animals lived in a marsh by the sea, but as humans discovered the land, they built on it, grazed their animals on it, fought over it, and changed it. Slowly all the sounds that came from the marsh were quiet and the animals that lived there went away.

Thematic Unit 4

Topic: SIMULATED SCIENCE CAMP

Environmental Concept: A simulated science camp is ideal for students to apply their knowledge of the environment. It is a hands-on experience that will raise students' awareness and enhance their appreciation of the outdoors.

Background:

The Earth has an unique environment in which our lives are dependent upon. By respecting and caring for the Earth, we are also respecting and caring for ourselves. It becomes apparent that our children need to gain environmental awareness, concern, and a sense of empowerment that they can make a difference. The simulated camp is a seven day program that helps students experience the natural world through observing, investigating, and discovery. They learn cooperation, respect, and concern for others. During the simulated camp, students engage in the subject areas of language arts, social science, mathematics, science, health, physical education and music. There are six trails: Discovery, Wildlife, Geology, Museum, Forest, and the Native American Trail. These trails are not real trails, but instead most are done right on the school grounds and, in some cases, in the classroom.

Day 1

ANIMALS AROUND US Discovery Trail

Objectives:

1. To learn how to set up camp.
2. To work cooperatively with others
3. To explore the school grounds for plants and animals
4. To discover how living things on our school grounds are adapted to for where they live.

Subject Areas: Science, language arts, social science, and creative arts.

Background: Setting up camp and learning how to work together to solve problems is a prerequisite to preserving our environment. By working as a team, students develop social skills of cooperation, sharing, compromising, and negotiating. On the **Discovery Trail**, students will discover that an environment that looks empty of life is capable of housing many animals such as spiders, ants, earwigs, and other small insects. Animals live in this area because it provides food, water, and shelter (American Forest Foundation, 1993).

Preparing:

1. Students will make badges, Camp Crawly Critters hats, binoculars, and shirts.
 - a. Badges can be made from tag board. Students can put the name of the camp, their names and small picture of themselves on the badges. Then the badges can be laminated. A pin can be glued on the back with a glue gun. Badges can be made with a button maker if your school has one.
 - b. Camp Crawly Critters hats can be made with tag board. The hats can be colored, laminated and then cut out. Sentence strips can be used as a strip of paper to put around the student's head. The hat can be glued onto the sentence strip and the sentence strip can be stapled together at the ends to make a circle the size of the student's head. (See Camp Crawly Critters Hat Pattern, p. 92.)
 - c. Binoculars are made with two bathroom tissue rolls. Cut construction paper to fit rolls. Have students decorate the construction paper before it is glued on. Glue the two rolls together. Put a rubber band around the two paper rolls to reinforce the glue until it dries. Punch a hole on each side of the rolls and string yarn through the holes. The yarn should be long enough to go around the student's neck and hang over the chest.

- d. Ask students to bring a plain, clean, white T-shirt to school. Give each student a copy of the T-shirt transfer. (See T-Shirt Transfer p. 93.) Each student needs to trace over the pattern with a black crayon. They can also color in the pattern with different colored crayons. Students' school crayons will work but be sure to tell the students to press hard on the crayon when coloring and outlining. Place the T-shirt design face down on the front of the T-shirt and lay a cloth over the top of it. Press the design with a warm iron to transfer the design on the T-shirt. To help make the design stand out better let the students go over the design with a thin black permanent marker or use fabric paints to make the design more colorful.
- e. Reminded students that their parents are to write to them during their time at camp and they are to write back later.
The camp address is: Camp Crawly Critters
 1234 Insect Rd.
 Bug City, California 56789

Materials:

1. Tag board
2. Badge pins
3. Glue gun
4. Crayons
5. Markers
6. Permanent black marker
7. Safari hat pattern (p. 92)
8. Sentence strip
9. Stapler
10. Bathroom tissue paper rolls
11. Construction paper (different colors)
12. Glue
13. Rubber bands
14. Yarn
15. Hole punch
16. Plain white T-shirt
17. Transfer pattern (p.93)
18. Iron
19. Fabric paint (optional)
20. Clipboard
21. Drawing paper
22. Colored pencils
23. Hand lens
24. Fitted sheets

25. Blankets or sleeping bags
26. Flashlight (optional)
27. Books
28. Pillows (optional)
29. Dome tents for 3 - 4 people
30. Large clean rocks and small sticks or drift wood. Use red cellophane and flashlights . (For imaginary fire)
31. Insect books
32. Insect report form (p. 96-97)
33. Pictures of insects, plants, other animals
34. What Is an Insect? by Robert Snedden or What Is an Insect? by Jenifer W. Day
35. Eyewitness Book: Insect by Laurence Mound
36. Miniature marshmallows
37. Large marshmallows
38. Toothpick
39. Project Learning Tree
State of California, The Resources Agency
Dept. of Forestry and Fire Protection
1416 Ninth Street
P.O. Box 944246
Sacramento, CA 94244-2460 ph. (916) 653-7958
"School Yard Safari" from PLT p. 151
"Web of Life" from PLT p. 150 "Variation-All Tied Up"

Procedure:

1. March out to the flag pole at your school chanting the Camp Crawly Critters March. (See "CCC March" p. 94 -95.)
2. At the flag pole, watch the flag go up. Students should salute the flag by putting their right hand above their eyes and stand with feet together as it goes up and as they recite the Pledge of Allegiance.
3. Students rest in at ease position with their hand clasped behind their back and their feet about a half a foot apart as the teacher calls roll. When a student's name is called that student will salute and say, "Camp Crawly Critters."
4. Choose one student to take the attendance folder to the office. That student will raise the folder above his/her head, pick his/her knees up high as he/she high steps to the office.
5. March out to the playground chanting the Camp Crawly Critters March. Once on the playground, do some warm-up exercise with the students.
Note: Procedure 1-5 can be done first thing in the morning every day of camp.
6. In the classroom, establish camping rules:

- a. Tents will be neat and organized.
 - b. Tents will remain open so campers can be observed.
 - c. Campers will read or play quiet games in their individual tents.
 - d. Campers will be polite and respectful to other campers.
 - e. Campers will share.
 - f. Campers will be helpful.
 - g. Campers will talk quietly.
7. Set up tents. This can be done by turning desks on their sides and stretching a fitted sheet across the top. It also can be done by stretching a fitted sheet across the top of two short bookcases. However, small dome tents work best.
 8. Demonstrate how to make a campfire by putting rocks in a circle and placing small pieces of wood in the middle like a tipi.
 9. Meet around the imaginary campfire. Assign 3 - 4 students to each tent.
Tell the students that each tent group will be researching an insect. Their tent will also be named after the insect that they study.
Explain to students that we will be studying insects because billions of them populate the Earth and that insects have a powerful impact on human activity.
 10. Before students choose an insect to study, the teacher will need to introduce insects to them. This can be done by reading What Is An Insect? by Robert Snedden or What is an Insect? by Jenifer W. Day and using Eyewitness Books: Insect by Laurence Mound. After reading one these books, ask students, "What makes an insect an insect?"
 11. Give each student six toothpicks, two miniature marshmallows and one large marshmallow. Tell students that an insect has three body parts. Using one toothpick, take the small marshmallow and attach it to the another small marshmallow. Tell students that the head is a body part connected to another body part, the thorax. Get the larger marshmallow and attach it to the back of the smaller marshmallow with another toothpick. Tell students that this large marshmallow is the abdomen. Take another toothpick and break it into three pieces. Do the same with another toothpick. Tell the students out from the thorax are the legs; three on each side. Break the last toothpick in half. Use these pieces as the antennae at top of the head. Explain to students that some insects have wings. Take a toothpick and break it in two. Attach each half of toothpick and place it on the thorax on top of insect pointing out away from each other a V-shape. Students can eat the marshmallows when activity is done.

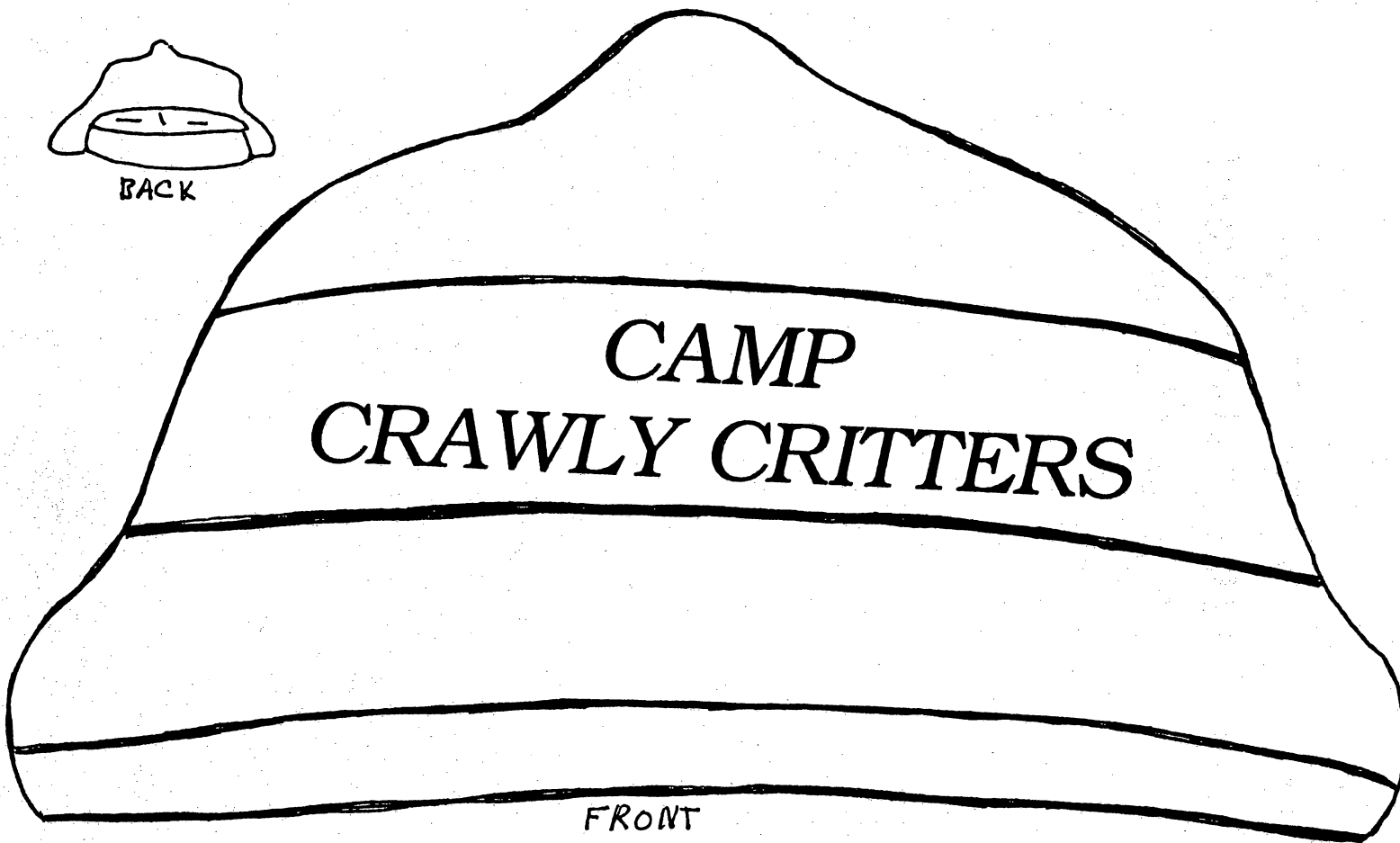
Guide students through the following information:

1. An insect has:
 - a. a segmented body divided into three body parts; head, thorax, and abdomen.
 - b. six jointed legs
 - c. external skeleton or exoskeleton
2. Insects belong to the Phylum Arthropods.
3. To defend themselves insects fly, run, jump, bite, and pinch. Tell students that they might also smell bad, taste bad, have exoskeletons, and camouflage themselves for protection. Ask students to name some insects that they know do some of these things to protect themselves.
4. Many insects live in moist areas such as ponds, streams, cracks in cement, under leaves, on the ground, and under scrubs.
5. Insects can be good news; helpful to other animals and plants:
 - a. They are a major source of food for fish, birds, reptiles, amphibians, and some mammals.
 - b. Some insects pollinate flowering plants.
 - c. Some insects recycle nutrients.
 - d. They may be able to provide cures for diseases because some produce useful biological chemicals.
 - e. They control pests so humans do not always need to use insecticides.
 - f. They provide us with important products, such as honey, dyes, and silk.
6. Insects can be bad news on a problem for humans:
 - a. Some insects can spread diseases which cause death in humans.
 - b. Insects are our greatest competitor for food.
12. This information about insects can be enlarged or made into an overhead for students to refer to when working on their reports.
13. Each team of students will meet in their assigned tents to discuss which insect they would like to study and why they chose that insect.
14. After students have chosen an insect, provide them with materials to make a banner to represent their insect and hang it on their tent.
15. Supply students with books about the insects they are to research. Students can read these books in their tents and discuss as a group the information that they have found.
16. Now they are ready to fill out a questionnaire to help them gather valuable information about their insect. (See Insect Report Form, p. 96-97.)

17. **Discovery Trail** (part 1):
Do activity "School Yard Safari" from PLT (p. 151). Have students use their binoculars to do this activity.
- Extending activity:**
Read fiction and nonfiction stories about insects.
Make a class poem about an insect.
Find out what an insect eats and make a food web.
A good activity for how animals and plants are connected to each other is from the activity " Web of Life" PLT (p. 148). "Variation-All Tied Up."
18. At the end of the day, students are to reflect on the day's events in their journal.



BACK



CAMP
CRAWLY CRITTERS

FRONT

Camp Crawly Critters Hat Pattern

T-Shirt Transfer

Camp Crawly Critters



This is an echo song reminiscent of the soldier march chants. The leader calls out a line and the campers repeat it. The campers' lines are in parenthesis.

CCC March

Hey, all you critters.
(Hey, all you critters.)
Crawly, crawly critters.
(Crawly, crawly critters.)

Crawling up the garden wall.
(Crawling up the garden wall.)
Active insects are the law.
(Active insects are the law.)

Sign on.
(Sign on.)
One. Two.
(One. Two.)
Sign on.
(Sign on.)
Three. Four.
(Three. Four.)
One. Two. Three. Four! One. Two.
(Three, Four!)

I'm thinking of crawly critters!
(I'm thinking of crawly critters!)
Hum! Buzz! ZZ! Zap!
(Hum! Buzz! ZZ! Zap!)
Crickets chirping.
(Crickets chirping.)
Frogs Burping.
(Frogs Burping)
Beetles clicking.
(Beetles clicking.)
Glow worms glowing.
(Glow worms glowing.)

Sign on.
(Sign on.)
One. Two.
(One. Two.)
Sign on.
(Sign on.)
Three. Four.

(Three. Four.)

Bring it on down! One. Two. Three. Four! One Two!

(Three. Four!)

Crawly camp is what it's called.

(Crawly camp is what it's called.)

It is made for one and all!

(It is made for one and all!)

Sign off.

(Sign off.)

One. Two.

(One. Two.)

Sign off.

(Sign off.)

Three. Four.

(Three. Four.)

Bring it on down. One. Two. Three. Four! One. Two!

(Three, Four!)

Name

INSECT REPORT

1. Name the insect you are studying. _____

2. What makes the animal you are studying an insect?
It has:

3. Where does the insect live? _____

4. What does the insect eat? _____

5. How does the insect eat? _____

6. How does the insect defend itself? _____

7. Report on some good news that you have found out about the insect you are studying.

8. Report on some bad news that you have found out about the insect you are studying.

9. What is unique and different about the insect you are studying?

10. Draw a picture of your insect.

Day 2 INSECTS, INSECTS, AND MORE INSECTS
Discovery Trail

Objectives:

1. To develop writing skills by completing a written report.
2. To develop creative arts skills by acting out short skits.
3. To develop artistic skills
4. To discover why the sense of smell is important to animals.

Subject Areas: Science, language arts, creative art, art, and social science

Background: On this Discovery Trail, students will identify with insects that use their sense of smell. Ants are good detectors of smells. When the working ant finds food it secretes a chemical from its abdomen to mark its trail so that the other ants will be able to find the food too (American Forest Foundation, 1993).

Preparing:

1. Save cardboard egg cartons for students to make bug eyes.
2. Make samples of insects, using recycled materials.
3. Model how to write a report using information from the Insect Report Form.
4. To prepare for the activity, "Peppermint Beetle" from PLT (p. 7), mark trees by moistening a cotton ball with peppermint extract. Rub the extract on trees at students' nose level. Trees in a row would be best for the students to follow. Cut many pieces of yarn large enough to fit around a tree trunk.

Materials:

1. 8 1/2 x 11 pieces of construction paper
2. 8 1/2 x 11 lined notebook paper
3. Other pieces of colored construction paper of various sizes
4. Glue
5. Glitter glue
6. Pipe cleaners
7. Foil
8. Hole punch
9. Cardboard egg cartons
10. Peppermint extract
11. Cotton balls
12. Yarn
13. Peppermint Beetle" from PLT (p. 7).

Procedure:

1. After the insect report form is completed, students can use it to write a research report on their insect.
 - a. Give each student a 8 1/2 x 11 piece of construction paper. Fold this paper in half like a book. This is the cover of their report.
 - b. Staple two pieces of notebook lined paper inside. Students will write their report on this paper.
 - c. Students need to design their insect using construction paper and other recycled materials they may need. This design will be glued to the cover of their report. Reports can be shared with the whole class.
2. Now that students are considered to be authorities on insects, they can work together to perform a short skit about their insect. These skits can be worked on each day of camp and then presented at an assembly the last day of camp. The teacher will need to meet with each tent group to listen to their ideas and help them create new ideas in their skit. Critter glasses can be made by using the following directions:
 - a. Use two of the egg holders on an egg carton for the eyes of the insect they will be performing. These can be decorated with glitter glue, foil, markers and other materials that the students come up with. Fit these holders over the student's eyes with the bottom of the egg carton holder sticking out. A large hole should be made at the bottom of each egg holder so students can see. Connect the two eyes across the nose with pipe cleaner. Using pipe cleaners, place two antennae on the sides of the egg holders so that they stand straight up. The ends of the antennae can be curled. To keep the eyes on, punch a hole at each end of the two egg holders. String a piece of pipe cleaner through each hole twisting it to stay in place and the other end of the pipe cleaner will go over the ears of the student wearing them.
3. **Discovery Trail (part 2):**
 - a. Explain to students that smell is important to insects. Use ants as an example. They produce a substance from their abdomen in which there is a smell to put on the ground to lead other members of their species to food. Students can do the activity, "Peppermint Beetle" in PLT (p. 7). This activity requires students to follow a trail of peppermint extract that has been deposited on several trees. When the students find that a tree has peppermint extract on it, they mark it by tying yarn around the trunk of the tree.

4. Students will reflect in their journal of the day's events. This can be done in their tents.

Resources:

1. San Bernardino County Museum
Insect Presentation
Ph. (909)307-2669 x221

Day 3

BECOMING A TRACKING ARTIST

Wildlife trail

Objective:

1. To begin to read tracks and signs of wildlife.
2. To develop better observation skills.
3. To identify the goals of tracking.
4. To immerse in ones senses, thus developing sensitivity to one's surroundings.
5. To learn to look, watch, and listen.

Subject Areas: Science, language arts, creative art, mathematics, social science

Background: A tracking artist, one who is in tune with nature, can read these signs. Tracking is not just finding the next track; but more importantly, it is learning how to read signs in nature. It is important for students to spend time learning about the animals and their ways, so they will know where and when to look. Students may not see any tracks at all, but they will learn that the environment around the school tells a story about the wildlife that live in the area. When something moves, it affects its surroundings. (Rezendes, 1992). Students will learn the rabbit, bear, and coyote walk so they can begin to look for details when going on a nature hike; such as, an artist looking for details when painting a picture. This lesson was designed with the intention of helping students learn to become good tracking artists. It is hopeful, that students will learn to see, hear, feel, and taste the difference in their surroundings. Their tracking goals are: to identify the animal that made the tracks, look for detail of the track, figure out how the animal was moving, and what the animal was doing (Brown, 1983).

Preparing:

1. Students need to understand the importance of knowing the animal in order track it. They should be provided with games and interesting activities that teach information about the wildlife in the area. One such activity has already been provided on the opossum. (Refer to "Reading Tracks" p. 112.)
2. Students should be provided with the definition of the word sign. According to Paul Rezendes, author of Tracking & the Art of Seeing, sign is defined as: "All indications of an animal's passage through an area, or of its living in an area, that are not directly related to the imprinting of that animal's foot on the ground. These include obvious things such as scat, remains of food, claw marks on the trees or shrubs, and trails, as well as some not-so obvious things, such as turned stones and stunted vegetation" (p. 22).

3. Make a bulletin board with tracks of different animals that inhabit the immediate area. Different animal tracks are available in Tracking & the Art of Seeing by Paul Rezendes. The board needs to have the following:
Nature detectives find tracks and clues that answer these questions:
 1. **What happened?**
 2. **Who was here? How do you know?**
 3. **What did it do? How do you know?**
 4. **What did it eat? How do you know?**
 5. **Where did it go? How do you know?**
4. Make a recorded tape of voice in nature or of loud, noisy children. This can be done by making a recording in the cafeteria at school.
5. A trail can be easily be made on a small area of your school grounds. Prepare a trail that has the following: scat, remains of food, claw marks on trees or shrubs, turned stones, feathers, a nest, animals fur, bits of a broken egg shell, a half eaten pine cone, and animal tracks.

Materials:

1. Paper
2. Pencils
3. Crayons
4. Glue
5. Scissors
6. Rulers
7. Egg shells
8. Acorns, feathers, tracking stamps (check local museum)
9. Twigs and branches
10. Pebbles
11. Laundry lint (for making scat)
12. Tracking cards with information about animals (see tracking cards)
13. Large pieces of white butcher paper
14. Cardboard
15. Tape recorder and a recorded tape of the voices in nature
16. Popcorn and popcorn maker
17. Sentence strips
18. How to Be A Nature Detective by Millicent Selsam

Procedure:

1. Students will be led on a prepared trail that has been planted with evidence of animal life. Before going on this hike, discuss good trail manners:
 - a. Walk quietly.
 - b. Stay on the trail.
 - c. Do not bother others.

At the end of the trail, ask students what they saw during their hike. Record their answers on a large piece of chart paper and save.
2. While students are out on their hike, have someone go to the room and leave a trail of human activity. This can also be done at recess if you do not have someone to assist you. Leaving signs, such as: freshly popped popcorn for smell and taste, disturbed chairs, desks, books, pencils and paper for sight, a recording of voices for hearing, can help arouse their senses that something different has taken place while they were gone.

This works best if the students have just cleaned the room before they left.
3. After students return to class, they should wonder what or who was in their room. Students may say, "I smell popcorn, I see papers and pencils, out, I see desk and chairs turned over, I heard voices when I came in." The teacher will ask the students the questions posted on the bulletin board.
4. The students should point out the different changes that were made in the room. The teacher can pass out the popcorn for students to eat while he/she explains that what they have just witnessed are signs of evidences that a human was here.
5. Students can brainstorm possible evidences of animal activity that they might see on a return hike to the prepared trail. The teacher can write their suggestions down on sentence strips and pin the strips to the bulletin board under the heading Evidences of Animals Life.
6. This is a good time to read the story, How To Be a Nature Detective, by Millicent Selsam.
7. After the story, the students can add to the list under the heading Evidence of Animal Activity. The list should contain the following: scat, nibbled branches, remains of food, feathers, claw marks on trees, shrubs, trails, turned stones, and tracks.

Hint: To save time, each item on the list could be covered and as students suggest them they will be uncovered.
8. The students can now work together in groups of four. Each group will be given a card which will provide them with information about an animal that they might see on the prepared trail. They are not to share that card with the other groups until later. Each group of students is responsible for making a smaller size model, showing

evidence that their animal has been to the area. They can do this on a large table, on the floor, or outdoors. Provide them with the materials that have been listed in this lesson. *Hint:* Materials could be in eight separate containers ready to be used. Empty ice cream tubs make a wonderful containers. The teacher may want to provide a model as an example. The cardboard could be use as a base from which to start. The white butcher paper is for the background.

9. After the models are done, each group can share their model with the other students. The students who made the model with each other can take turns asking the other students the Nature Detective's Questions listed on the bulletin board. Then, the other students can guess what animal they think it is.
10. Discussion Questions:
 - a. What kinds of things should you look for when looking for signs of wildlife?
 - b. What did you like most about your model that illustrated evidence that an animal had been in the area? Why? What did you like the least? Why?
 - c. Which group best portrayed evidence of their particular animal? Why do you think so?
 - d. How did you show what animal it was?
How did you show what the animal was doing?
How did you show what the animal was eating?
How did you show where the animal was going?
11. This next activity was adapted from Tom Brown's Field Guide To Nature Observation and Tracking. Take the students on a short hike to teach them the coyote walk. Tell students to begin the hike with their normal pace. Walk for about two minutes and stop. Tell them to take a deep breath and relax their body. Then return by the same route; only this time, at one tenth the pace as they went before. On the returned leg of the coyote walk, they will realize they've tricked themselves into seeing how much they miss by moving so fast.
12. Discussion questions: What did you see? What did you hear? What did you smell? What did you sense? Did your observation skills improve on you return trip? Why do you think so?
13. Now students are ready to return to the prepared trail. Ask them to look for sign of animal activity. Give them the definition of sign; evidence of an animal's passage or animals living in an area. Students can point out evidence of animal activity on the trail. At the end of the trail, ask them what they saw. Record their answers on large chart paper. Compare this list of evidence with the recorded answer from the first hike. During the second hike,

students will begin to notice more and therefore, their list of evidence should be longer than the list from the first hike.

14. Discussion questions:
 - a. How did your second hike differ from the first hike?
 - b. What did you learn?
15. To assess students learning, have students fill out the Student Evaluation form. (See Student Evaluation, p. 110-111.)
16. Home learning suggestions:
 - a. Ask students to spend some time out-of-doors and practice looking for signs of wildlife in their home area. Tell them to keep a journal to record what they see, hear, smell, and feel; and what they like about the area they are observing.
 - b. Ask students to observe a specific animal in their area and describe it in their journal.

Extensions From Project WILD:

1. "Ants on a twig," where students observe ants or other animals.
2. "Wildlife Is Everywhere," where students search their environment for evidence of wildlife.
3. "Microtrek Treasure Hunt," where students go outside on a "treasure hunt" for wildlife.
4. "Habitacks," where students identify the components of habitat by using a map and exploring their school grounds.
5. "Habitat Rummy," where students make cards and play a card game.
6. "My Kingdom For A Shelter," where students create replicas of wildlife shelters.
7. "Tracks," where students make plaster casts of animal tracks.
8. "Environmental Barometer," where students observe and count or estimate wildlife in an area.

Resource:

1. San Bernardino County Museum
Ask for tracking kit
phone # (909) 307-2669 x221
2. For information on how to obtain Project WILD
Contact: Dr. Darleen Stoner
California State University San Bernardino
Professor and Program Coordinator
Environmental Education
(909) 880-5640

◇ **Tracking cards**

◇

◇

Rabbit

◇ **Class:** Mammal

◇ **Diet:** leaves, clover, grass, weeds, twigs, fruit, vegetables

◇ **Defense:**

◇ very fast, good sense of hearing, can camouflage themselves the summer and winter months, sits still, and runs away.

◇ **Top Speed:** 18 miles per hour

◇ **Sign:**

◇ **Form:**

◇ Rabbits make shallow depressions in the ground, usually under a dense thicket and they line them with fur and soft grass when they are having their young.

◇ **Browse:** They leave a perfect forty-five-degree-angle cut on twigs.

◇ **Scat:**

◇ Droppings may be wrinkled or shriveled, and round, with some shape variations. It may be found close to thickets, and brush where it hides. A pile of droppings indicates that the animal has been staying and eating in one spot.

◇ **Tracks:**

◇ **Measurements -** The rear track is less than 1 1/2" wide, and the front is less than 1 1/4".

◇ The two small front tracks are one in front of the other, while the two hind tracks are side by side in a triangular pattern.

Skunk

- ◇
- ◇ **Class:** Mammals
- ◇ **Diet:** caterpillars, crickets, beetles, mice, rats, eggs, bees eggs, fruit, grain
- ◇ **Defense:** terrible smell
- ◇ **Top Speed:** 4 miles per hour
- ◇ **Sign:**
 - ◇ **Dens:**
 - ◇ abandoned dens, crevices of trees, or under buildings. They can dig their own burrow.
 - ◇ **Digs:**
 - ◇ digs up ground bees, leaving discarded hive material scattered about the dig site. May find crushed bird eggs and torn nest.
 - ◇ **Scat:**
 - ◇ usually composed entirely of insects and is 3/4" in diameter. They also eat small animals and fruit, in which case the scat will contain ruminates of hair and seeds.
 - ◇ **Tracks:**
 - ◇ They have five toes on their front and hind feet, very smooth, continuous palm pads, and relatively small heel pads. They have long front claws, for digging. Look for small dots ahead of the toepad. They walk on the soles of their feet, the heel pads often don't show in the track of the fore feet.
 - ◇ **Measurement -** The forefoot usually measure 1 7/8" to 2 3/6" long by 1" to 1/8" wide; that of the hind foot measures 1 3/4" to 2" by 1" to 1 1/8" wide.
 - ◇ **Patterns -** 2-2 hind and front tracks close together.

Opossum

- ◇
 - ◇ **Class:** Marsupials
 - ◇ **Diet:** everything, vegetable and animals
 - ◇ **Defense:** It plays dead giving a very unpleasant smelling liquid from its anal glands.
 - ◇ **Sign:**
 - ◇ Dens: takes over abandoned dens of other small animals.
 - ◇ Behavior: Nocturnal
 - ◇ Scat: often indistinguishable from that of many other animals.
 - ◇ Tracking:
 - ◇ five toes on front and five on back. Its toes spread out leaving a star-shaped track. Its hind feet has the extended thumb that reaches way off to the side. It has no nail.
 - ◇ Measurements - front is 1 1/2" to 2 1/8" long by 1 3/4" to 2 3/8" wide. Rear is 1 3/4" to 2 3/4" long by 1 3/4" to 2 7/8" wide.
 - ◇ Pattern - rear feet fall next to or partially on top of their front tracks.
-

Raccoon

- ◇
- ◇ **Class:** Mammal
- ◇ **Diet:** grain, seeds, leaves, acorns, eggs, fruit, fish, frogs, grasshoppers, mice. meat
- ◇ **Defense:** sharp teeth and claws
- ◇ **Top Speed:** 40 miles per hour
- ◇ **Sign:**
 - ◇ Dens:
 - ◇ abandoned bird's nest, hollow trees, with cavities, rock crevices and caves, wood or brush piles.
 - ◇ Digs: digs in pursuit of yellow jackets, or ground bees.
 - ◇ Scat:
 - ◇ Defecate randomly but often, choose beside a large tree, on stone wall. Reddish to yellow, black, or many shapes of brown. It may be made up of insects, grains, and fruits.
- ◇ Tracking:
 - ◇ Pattern - 2-2 walking pattern side by side. The front tracks are smaller than the rear and the pattern is small on the left and large on the right: then it changes. So the front and rear alternate.

Coyote

- ◇
- ◇ **Class:** Mammal
- ◇ **Diet:** rabbits, gophers, mice, rats, squirrels, sheep, insects, reptiles, berries, grass, grasshoppers
- ◇ **Defense:** sharp teeth and claws
- ◇ **Top speed:** 40 miles per hour
- ◇ **Sign:**
 - ◇ **Dens:** rocky ledges or steep or brush covered slopes. Look for mound of dirt outside the entrance hole and signs of activity (tracks, pieces of bone, fur, etc.).
 - ◇ **Kill Sites:** blood, hair
 - ◇ **Scat:** found in the middle of the trails, sometimes at a high point, on a stone. Coyotes make elongated narrow scratches with their front and hind paws after urinating or defecating. Scat very dark if it has eaten the organs from a fresh kill. Contains mostly hair and may look twisted or have tapered end. Most is 5/8" to 3/4" in diameter.
 - ◇ **Tracks:**
 - ◇ **Measurements:** The front foot is larger and rounder than the rear. They have five toes on the front; the first toe, the dew, is raised higher on the leg and usually does not register. There are four toes on the rear. The front track is 1 5/8" to 2 3/8" wide and 2 3/8" to 3 1/8" long. The rear track is 1 1/2" to 2" wide and 2 1/4" to 2 3/4" long.
 - ◇ **Pattern:**
 - ◇ one track directly on top of the other. The stride is 17 1/2" to 26", with average of about 19" to 21". The trot length ranges from 22" to 30", with the average of 26". The gallops will range in length from 52" to 74".

Tracker

Student Evaluation

1. What does it take to be a good tracking artist?

2. What are the goals of a tracker?

3. What are five questions a nature detective asks when looking for evidence of wildlife?

4. Make a list of the things to look for when you are out on the trail.

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

5. Do you feel that you have become a good tracking artist? If so, what makes you think so?

6. What is the value of learning to read tracking and sign?

7. Tell about the activity that you liked best.

Reading Tracks

Objective:

1. To give students information about a particular animal that lives in the area.

Subject Area: Science, language arts, and creative arts.

Background: An opossum can live in an abandoned den. This can be a hollow tree stump or a hole in the ground. Opossums like to hunt at night. They eat almost anything. That is why their scat is often indistinguishable in form from that of many animals. Opossums commonly eat eggs, berries, fruit, and mushrooms, as well as snakes and mice. Opossums have fifty teeth, more than any mammal in America. It is the only marsupial found in North America. A mother can have fifteen or twenty babies. When the babies are born, they are so tiny that as many as twenty could fit into a teaspoon. The babies hairless, blind, and deaf, and not fully formed.

Preparing:

1. Make a wanted poster for a Whingdingdilly.

Materials:

1. Wanted poster
2. The Whingdingdilly by Bill Peet
3. Tag Board
4. Glue
5. Tape
6. Cue Cards p. 114-115

Procedure:

1. Tell students that there is a Whingdingdilly running loose in our classroom; that we must track it and release it before he eats everything. Ask the students if they would be willing to help you find this creature.
2. At this time, the students may be asking what a Whingdingdilly is.
3. Tell students, "According to "Bill Peet, who wrote, The Whingdingdilly, (raise the book so the students can see it), it is the only one of its kind in all the world." Ask students to take a closer look at the wanted poster. Ask them what they see? Ask students to name the parts of the animal they see in the poster. Say, "Yes, yes it is an animal made up of other animal's parts. Only our Whingdingdilly does not look like this one."

4. Divide the class into groups of five. Give each group of students a 3"x5" card which will give clues to the animal they are trying to find. (See Clues for Making Our Whingdingdilly Opossum, p. 114-117.) Ask students to read their card to their group and then make the body part of the animal on a piece of tag board. After each group has made their body part according to the cue, have a student in the group read their clue to the class while another student tapes the body made on a board. Continue this process until a complete animal is made.
5. As each group puts up their drawing of the animal part, choose one person to guess what the animal is until the animal is guessed correctly. After all the main clues have been read, it is hopeful that the students will realize that they are trying to find a opossum. Continue to read the rest of the cues which contain even more information about your animal.
6. Now that the students have information about the opossum, its tracks, and its signs, they should have enough information about a opossum to be able to identify it, if there is evidence of one on the nature trail.
7. Now read the story, the Whingdingdilly.
8. Students can reflect in their journal at the end of the day.

Clues for Making Our Whingdingdilly Opossum

1. It is as big as a cat. Its body is covered with grayish fur. The fur is like that of a grizzly bear.
2. Its head is white and shaped like a rat.
3. It has black thin ears like a pig.
4. It has black eyes like a rat.
5. It has a long pointed snout like a pig.
6. It has a tail like a monkey and can hang and swing on a branch. It can use its tail like a fifth leg to climb and the tail can act as a hand to carry things.

7. It has five delicate, elongated, separated toes looking similar to the hands of a baby human. The bottoms of its feet are naked. The front feet has four palm pads and two heel pads. The hind feet has four palm pads and a single heel pad. The inside toe, or thumb of the the hind foot is opposable (thumb or toe can be used for grasping and picking up items) and has no nail. It can climb trees with its toes.

More Clues About Opossums

(Students can take turns reading the rest of these aloud.)

8. It can live in an abandon den and sometimes moves into a den that is still occupied by other animals. That den can be a hollow tree stump or a hole in the ground.
9. It likes to hunt at night. It eats almost anything. That is why its scat is often indistinguishable from that of many other animals. It does, however, commonly eat eggs, berries, fruit (especially persimmons), and mushrooms, as well as snakes and mice.

10. It has fifty sharp teeth which is more teeth than any mammal in America.

11. It is the only marsupial found in North American.

12. A mother can have fifteen or twenty babies. When the babies are born, they are so tiny that as many as twenty of them could fit into a teaspoon. The babies are hairless, blind, and deaf, and not fully formed. But these newborn babies have claws on their front feet. They use these claws to help them crawl into the mother's pouch all by themselves. Once they are attached to the nipples, they do not let go for about nine weeks. Since the mother opossum usually has thirteen nipples, any extra babies in the pouch starve and die.

13. At about nine weeks the babies are fully developed and they are about the size of a mouse. They come out of the mother's pouch and climb on her back for a ride. Then they return to the pouch

14. At twelve to thirteen weeks, the babies become too heavy to stay in the pouch. They still stay close to their mother until they are big and strong enough to look after themselves. Once they go their own way, each of them lives alone.

15. The father does not help take care of the babies. He lives alone in his own den.

16. It moves slowly but can move briskly when danger is near. When it is chased by other animals, and it cannot get away, it will be playing possum or pretend it is sleeping. It does this by lying down and staying very still. Its eyes and mouth are half open, and its tongue hangs out. Even its heartbeat and breathing slows down. It looks dead. It can play possum for a few seconds, or as long as six hours.

Day 4

ROCK AND MOUNTAIN FORMATION AND IDENTIFICATION Geology Trail

Objective:

1. To examine and discover the composition of rocks.
2. To compare the composition of rocks.

Subject Areas: Science, geology, geography, creative arts

Background:

Rocks are continually being formed. There are three different types of rock formation: sedimentary, igneous, and metamorphic rocks.

Rocks that are formed from mud, sand, gravel, bones, shells and other animal matter piled up in layers under water are called sedimentary rocks. Limestone, sandstone and coquina are sedimentary rocks. Many times they look like layers of sand and shells pieced together. The Dakota Indians used sandstone to carve into peace pipes used in religious ceremonies. Rocks that are formed from melted rock deep in the Earth are called igneous rocks. Obsidian is an igneous rock that is glassy in appearance and was used by Native Americans to make knives and spear points. Rocks that are formed from the heat and pressure deep in the Earth are called igneous rocks. Sedimentary rocks are called metamorphic rocks. Slate and gneiss are metamorphic rocks.

Rocks are made up of many minerals which have different properties. They look different because of the different minerals that contain. Some rocks are hard and others are soft. Some are black and some are clear (Atwater, et al., 1993).

Preparing:

1. Ask students if they have ever broken a rock before? If so ask them to share what they found inside the rock.
2. Tell students that we will break rocks today to discover what is inside a rock.

Materials:

1. 5 hammers
2. 5 goggles
3. Hand magnifying lens
4. Paint, glitter glue, glue gun
5. Round smooth rocks
6. Magnets
7. Ziplock sandwich bags
8. 1 hand towels for every four students
9. Cloth pins
10. How Mountains Are Made by Kathleen Weidner Zoehfeld

Procedure:

1. Go over the following rules with your students before they break rocks:
 - a. Always put on goggles before breaking a rock.
 - b. Hammer with the blunt end of hammer.
 - c. Do not get too close to another person that is breaking a rock. Stay two arm distances apart.
 - d. Put rock in a shallow hole in the dirt so it stands up and does not spray small chips into the air.
 - e. Raise your hammer no higher than your shoulder to hit the rock.
 - f. Hit the weak part of rock.
 - g. Trade hammer for a magnifying lens.
2. Divide students in groups of four.
3. Students will take turns in their group sharing hammers, goggles and magnifying lens to investigate the inside of the rock and to identify what is in their rock. While students are looking at their rocks, explain to them that some minerals get mixed up together, blending together. This blending makes it hard to identify what the mineral it is. Ask students what happens when you mix flour and sugar. Do you know which is the flour and which is the sugar? Also explain that some minerals can be seen. Explain that when you mix large things like chocolate chips in the flour and sugar mixture, the chips can be seen. Have students look for the three major minerals found in rocks:
 - a. Mica - black shiny sometimes silver. It is soft.
 - b. Feldspar - pink, sometimes bleached. It is hard.
 - c. Quartz - milky opal.

Note: (Teachers who do not like the idea of students breaking their own rock can have an adult break the rocks before the lesson or during the lesson and the students can investigate the pieces with a hand lens.)

4. Collect rocks to make rock pets. Students can walk around the school grounds or the teacher can bring in smooth round rocks. Students can decorate these rocks with other smaller smooth rocks, paint, and glitter glue. Have an adult use a glue gun to glue smaller rocks onto the bigger rock where students desire.
5. Give each student a magnet. Have students look for iron in the soil on the playground. Assign different areas to collect iron to see if there is more iron in one place than other. Let them collect the iron in a Ziplock sandwich bag Label bags according to the area students will be looking at. Areas to collect from could be under a tree, in a sand box, near a large rock, next to a building. After the collections are finished compare and contrast the different amounts of iron collected. By hanging the bags next to each other

- with a cloth pin, discuss why some places have more iron than others.
6. Talk to the students on how mountains are made.
 7. Read How Mountains Are Made by Kathleen Weidner Zoehfeld
After reading the story ask the following questions?
 - a. If oceans are not at the top of a mountain then why are fossils from ocean animals found there?
 - b. Why do mountains look different in parts of the world?
 8. Divide students up in groups of four. Give each group of students a towel. Lay the towel flat on a table. Have one student put his/her hand on each end of the towel. Slowly have the students slide their hand together. Folds and ridges will appear. Tell students that this is what happens when the Earth's plates press against each other.
 9. Have students reflect in their journals of the day's events.

Day 5 ANIMAL, AND PLANT DIVERSITY AND ADAPTATIONS
Museum Trail

Objectives:

1. To be able to organize different species of plants and animals in groups according to their various characteristics.
2. To determine how these particular characteristics indicate how the plants and animals are adapted to the environment in which they live.

Subject Areas: Science, math

Background:

Animals and plants are adapted to the environment. These unique adaptations help animals and plants live, grow, and reproduce. The interaction of living and non-living factors such as land, atmosphere, water, and sun (L.A.W.S.) result in biological diversity. The result of this diversity depends on the genetic and behavioral capacity of the species. This concept of biological diversity explains why there are so many different species (American Forest Foundation, 1993).

Preparing:

1. Reserve the General Habitat Kit from the San Bernardino County museum. This kit includes a variety of plants and animals from four regions: desert, mountains, chaparral/sage, and riparian. This kit must be reserved at least two weeks in advance. Call (909) 307-2669 x221.
2. Set out the different items in the kit and label them according to the area of land they inhabit.
3. Prepare a chart and cards for a game as described in "Charting Diversity" from PLT (p. 27).

Materials:

1. General Habitat Kit
2. Chart Paper
3. A copy (one per pair of students) of cards for game.
4. Museum report (p.123)
5. Pencils
6. Scissors
7. "Charting Diversity" from PLT p. 27

Procedure:

1. Tell the students that the museum kit has plants and animals from different regions of land: desert, mountains, chaparral/sage, and riparian.
2. Walk over to each of the regions, pointing out the different characteristics of the plant and animals and their adaptations that help them survive. Compare and contrast the different plants and animals in the regions. Compare the leaves, stems, and flowers if any. Compare the animals' mouths, beaks, appendages, outer covering, ears, nose, and the way the animal is built.
3. Divide the students into small groups to work on some of the games provided in the General Habitat Kit. These games are simple and provide a way to introduce the animals in each region.
4. Have students walk around the museum kit, free to explore and touch. After 15 minutes of free time, tell students to get in pairs. Give each pair a clipboard with a museum report. (See Museum Exploration p. 123.) Assign each pair a region to report on.
5. After the report is finished, ask student to compare their finding with other students who worked on an animal from a different region.
6. Now have the students work on "Charting Diversity" from PLT (p. 27).
7. Students will return to their tents to reflect on the day's events.

Names _____

Museum Exploration

1. Name an animal in region _____

2. Where does it live? _____

3. What does it wear? _____

4. Is it a meat eater or a plant eater or both? _____

How can you tell? _____

5. How do you think it defends itself? _____

Explain your answer. _____

6. How do you think this animal moves? _____

7. Draw this animal.

Day 6

FOREST AND TREES Forest Trail

Objectives:

1. To compare, classify, and categorize, trees found in the forest.
2. To learn more about trees and their distinct characteristics.
3. To identify relationships and patterns.

Subject Areas: Science, language arts, mathematics, creative art, physical education

Background: Conifers are trees that have seeds that develop inside cones and their leaves are needle-shaped. These trees are called evergreens, which means they do not lose their leaves and they stay green all year. Deciduous trees lose all of their leaves. Trees need water, food, and space. If these important ingredients are not met, it may retard the tree's growth or the tree may even die. The cross-section of a tree is called a tree cookie. This section reveals the growth rings that tell the history of the tree. If the tree has not gotten the proper ingredients to grow, the tree rings will indicate this (American Forest Foundation, 1993).

Preparing:

1. Identify trees and scrubs on your school grounds.
2. Create tree identification sheets. This is explained in PLT (p. 245).
3. Collect twigs or small branches.
4. Invite guest speakers from the Children's Forest.
5. Invite employees from the nearest Forestry Fire Station. Ask about Smokey The Bear coming to visit.

Materials:

1. The Tree A First Discovery Book by Scholastic
2. Laminated leaves from different trees.
3. Plain paper
4. Crayons, pencils, thin colored markers
5. Yarn
6. Paper
7. Paper sacks
8. Clipboards
9. Tree cookies (see resources p.126)
10. "Name That Tree" from PLT p. 244
11. "Tree Cookies" from PLT p. 291 "Variation-My Life As A Tree"
12. Twigs of small branches
13. Sandpaper
14. Paper plates with ridges

Procedure:

1. Read the following 1989 speech by George Bush in Sioux Falls, South Dakota:
"Trees can reduce the heat of a summer's day, quiet a highway's noise, feed the hungry, provide shelter from the wind and warmth in the winter. You see, the forests are the sanctuaries not only of wildlife, but also of the human spirit."
2. Ask students to tell about their experiences with trees. Such as a treehouse or a swing tied to a tree or a special tree in their backyard.
3. Read The Tree *A First Discovery Book*.
4. After reading, ask students the following questions:
 - a. How do trees begin?
 - b. What is the function of the roots?
 - c. What happens to leaves before they fall?
 - d. When do leaves start to fall?
 - e. Why is the tree important to animals and insects?
 - f. Name two ways you can recognize different kinds of trees.
 - g. Which trees are very big? Round and golden? Tall and pointy? Have branches that droop and bend? Thin with white bark?
 - h. What leaves have tiny teeth along its edges? Are shaped like a heart? Have rounded edges? Is made up of many small leaves? Has five points?
 - i. What trees stay green all year-round and have sharp leaves that do not fall to the ground? What are these leaves called?
5. Students will work in groups for leaf rubbings. Ask students if they can identify the different leaves they rub. To do this activity students need to take a plain piece of paper and put it over the leaf. Then students rub the leaf with the broad-side of any colored crayon. Bark rubbings can also be done by placing the paper over the bark of trees and rubbing with the crayon.
6. "Do Name that Tree" from PLT (p. 244).
7. Give each student a cookie tree. Do "Tree Cookies" from PLT (p. 291), "Variation-My Life As A Tree."
8. Have students sand the tree cookies until they are smooth to the touch. Walk around and check each cookies to make sure they are smooth.
9. When the tree cookies pass your inspection, talk to students on how they should decorate their tree cookies. (See tree cookie samples p. 127.) Most students put the name of their camp and a picture of themselves at the camp. Insects can also be drawn on

- their tree cookies. After this discussion a sample may be shown. Now give students the thin colored makers to decorate their cookie.
10. Give each student a piece of yarn to string through the tree cookie trees.
 11. Guest speakers can be someone from the San Bernardino Mountains, someone from a forestry stations, and someone from the United States Fish and Wildlife Service.
 12. Have students reflect on the day's events in their journals.

Resources:

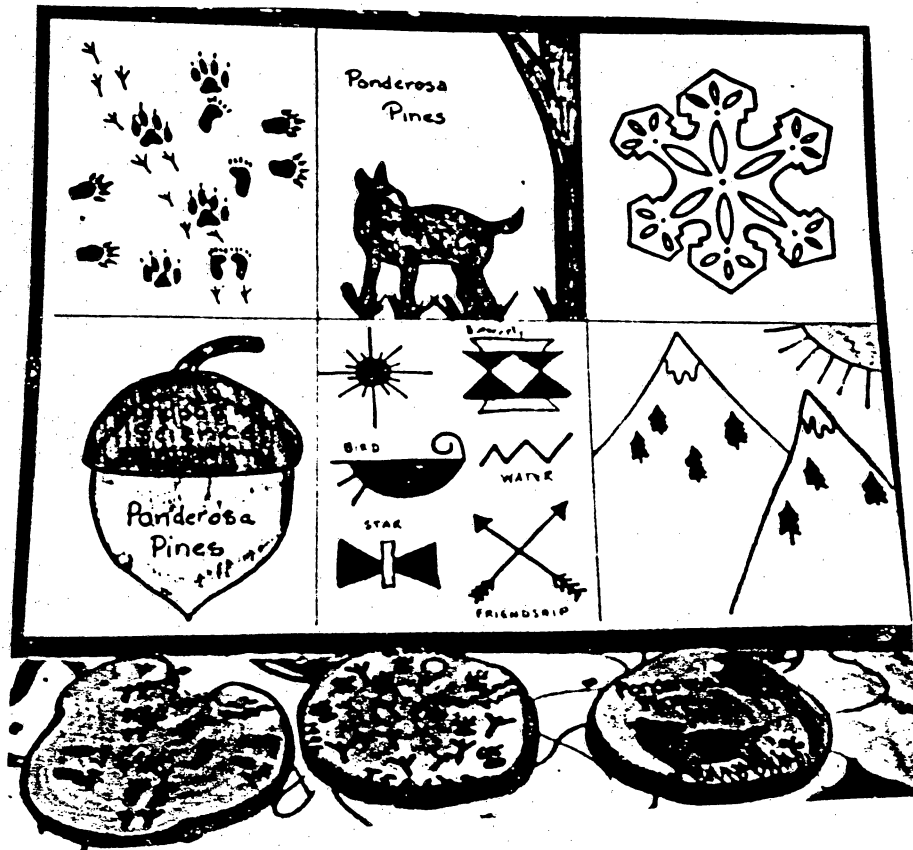
1. Cookie trees can be ordered from the following address:
TREE COOKIES
Thomas W. Catchpole
29295 Auberry Road, P.O. Box 105
Prather, CA. 93651
(209) 855-2194
2. Children's Forest
(909) 337-5156
3. Smokey the Bear
Ask for the Little Creek Station
(909) 794-1123 or (909) 432-0071
4. United States Fish & Wildlife Service
370 Amapola Ave.
Torrance, CA. 90501
(310) 328 - 6307

Field Trip:

1. State of California
Ask for Supervising Ranger or
State Park Ranger 1
Department of Parks and Recreation
Los Lagos District/Silverwood Lake SRA
14651 Cedar Circle
Hesperia, CA. 92345-9799
(619) 389 - 2281 FAX (619) 2401

TREE COOKIES

(Samples of designs that could go on the tree cookies.)



Day 7

NATIVE AMERICAN FUN Native American Trail

Objectives:

1. To test out observation skills using all the senses.
2. To work cooperatively with a friend to be successful and, therefore, understand the importance of interdependence.

Subject Areas: Science, language arts, mathematics, creative arts, physical education.

Background: The Native Americans believed in interdependence. They knew the importance of how living and nonliving things are dependent upon each other. These games and activities will further that concept as students depend upon each other to complete some of the activities. To prevent dehydration, students will be given a birdie drink. A birdie drink is given by standing higher than the students and dripping water in their mouth without touching their mouth with the canteen.

Preparing:

1. Get parent volunteers, and older students to help set up the stations. Meet with volunteers to discuss how they will run the stations.
2. Soak corn husks in a container while you are out hiking.
3. Get parents to cut yarn for the necklaces and bracelets. For the bracelets, tie three pieces of yarn together.
4. Prepare the stick game using tongue depressors.
5. Staple the scavenger hunt list on lunch bags:

fallen leaf	fallen twig
blade of grass	sharp stone
piece of paper	dried weed
bark on the ground	flowering weed
dandelion	round stone
can	can lid
6. Mix trail mix and put in Ziplock sandwich bags.

Materials:

1. A book of Indian Legends
2. Water bottles or small canteens
3. Paper plates, crayons, glue
4. A tape recorder playing music from nature
5. Watercolors, Q-tips, water, cups
6. Fruit loops, yarn, scissors
7. Three skeins of different colored yarn

8. Dice
9. Three bags of Corn Husks
10. Paper lunch bags
11. Sticks, small pebbles, feathers, corn husk, rubber bands, small containers, chalkboards, chalk, tongue depressors, markers.
12. Students are asked to bring different ingredients that will go in trail mix; banana chips, coconut, dried fruits, shelled peanuts, and raisins.
13. Ziplock sandwich bags
14. Large bowl
15. Six gunny sacks (Look up Fishing Tackle Dealers in the yellow pages.)
16. Camp Crawly Critters certificate p. 132
17. S'More Bars recipe p. 133

Procedure:

1. The Native American Trail will begin in the classroom sitting around the fire. The teacher will read an Indian Legend to the students.
2. Students will walk to the nearest park or undeveloped land. Students can chant the Camp Crawly Critters song along the way.
3. When the class arrives at the destination, remind students of our wildlife trail rules. Hike a trail and look for evidences of animal life. Observe the different plant and animal life in the area. Stop along the way to give students birdie drinks (students tip head back and water is pouring into their mouth). Assign different students to carry the canteens. Give students a small bag to collect small items of interest no larger than a fifty cent piece. Tell students that they are not to disturb animal homes or pick up live animals.
4. At the end of the trail. Ask students what they saw. Ask them the Nature Detective Questions from their wildlife trail. Pass out paper plates, crayons and glue. Have students color their plates and then glue their samples on the plate. When students finish, collect all plates and put them in a bag.
5. Hike back to school and get ready for the Native American Fun Activities.
6. Set up the following five stations at school:
 - a. Face Painting Station
Using water, watercolors, and a Q-tip paint have some older students or parent volunteers paint pictures of insects on the children's cheek.
 - b. Beaded Necklace Station
Students will sit on blankets while they string fruit loops through a piece of yarn to make a Patterned Native American Necklace.

c. Friendship Bracelet Station

Make a bracelet with three pieces of yarn. Have a friend hold one end while the other friend braids the yarn. Switch places and do it again so that each pair of students has a bracelet.

d. Indian Game Station

1. Gunny Sack Relay Races -Students put both feet in sack and jump to the finish line. A friend can join in by putting the right leg of one friend and the left leg of the other friend in the sack.

2. Playing A Stick Game - Use four tongue depressors. Draw a zig zap red shape on two sticks. This represents a snake. Leave the other side of sticks plain. Draw blue dots on the other stick making a row of dots going length-wise across the stick. This represents the man. To play and score, hold all three sticks in both hands. Toss them in the air. Points are determined by the way they land. Refer to the following chart:

All plain sides up = 4 points

2 snakes + 1 plain up = 6 points

2 plain + 1 snake up = 6 points

2 plain + 1 man up = 2 points

2 snakes + 1 man up = 2 points

1 plain + 1 snake + 1 man up = 0

3. Stick Toss - Plant one stick in the ground. The students get three tries to knock it down by throwing another stick at it. They must stand 6 feet away from planted stick.

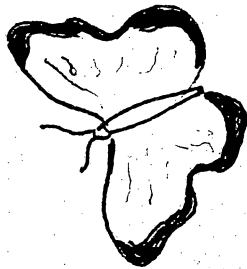
4. Pick-up Sticks Relay - Line up ten sticks about 18 inches apart, like rungs of a ladder. Line up another ten sticks for the other team. At the signal the first player of each team will hop with one foot over each stick, all the while making animal sounds. At the end of the row, they pick up the last stick and hop back to the starting line. Place stick so that it lines up with the first line. That is the signal for the next player to start hopping. The first team to complete the circuit wins.

5. The Bug Game - This game can be played with 2-6 players. Find a small dirt area to play. Players will need one small stick to draw in the dirt. and one die. Each player will attempt to complete a Bug by drawing in the dirt which will look like this:

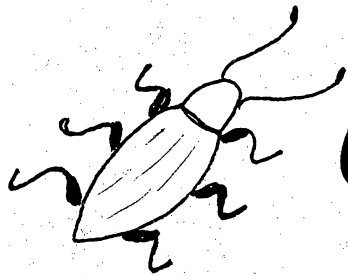
To get started, a player will need to roll a one, for

- student to make the body. After that, a two is needed for the head, a three is needed for one leg, a four is for the eye, a five is for one feeler and a six is for a tail. The first player to complete the Bug wins.
6. Pok Key - Use corn husks that have been soaking in water for a couple of hours. With two thin pieces of husk make a cross. Now bend back the husk one side after the other until you have a rectangular bundle. Get two more thin pieces of husk and wrap the rectangular bundle like a hobo's pack. Wrap a rubber band around the bundle real tight. After it dries the students can play with it like a hacky sac. The object is to keep it in the air using hands and feet. The first person to keep it in the air the longest, without it falling on the ground, wins the game.
 - e. Scavenger Hunt Station - Divide students in small groups and give each group a lunch bag with a hunt list stapled to it. Set a time limit and an area. As students find an item on the list they will place it in their bag. The first group to find all the items on the hunt list and return to the starting point wins. Have each group of students compare and contrast their discoveries.
 7. After the Native American American Fun Activities is done, return to the classroom so that students can reflect in their journal.
 8. Afterwards sit around the fire, passing out trail mix in Ziplock bags and S'More Bars. While students are eating, pass out their Crawly Critters certificate. (See S'More Bars recipe and Camp Crawly Critter Certificate, p. 132 & 133.)
 9. Break camp and go home.

Camp



Crawly



Critters

presents

this participating award to

*for being a critter bug of a
camper!*

Date

Camp Counselor

S'More Bars

1/2 stick of butter
1 cup graham cracker crumbs
3/4 cup sweetened condensed milk
6 oz. bag chocolate chips
2 cups miniature marshmallows

Preheat the oven to 350°. Place the butter in the pan and melt it in the oven for three minutes. Remove the pan from the oven and sprinkle the graham cracker crumbs evenly over the melted butter. Pour the sweetened condensed milk over the graham cracker crumbs. Sprinkle the chocolate chips evenly over the milk. Layer the marshmallows over the chips. Press down on the marshmallows with your fingers. Bake in the oven for 30 minutes. Cool completely and then cut into squares.

Yield: 16 squares

**Recommended Resource Books
For Simulated Science Camp
Thematic, Unit 4**

Bender, Lionel. First Sight Poisonous Insects
Shooting Star Press, Inc., 1995

Bernard, Robin. Bug Book
Scholastic, Inc., 1994

Brown, Tom, Jr.. Tom's Brown's Field Guide To Nature Observation and Tracking
Berkley Publishing Corporation., 1983

Insect World Time-Life Books Inc., 1988

Jeunesse, Gallimard. A First Discovery Book The Tree
Scholastic, Inc., 1989

Mayberry, Sally & Bath, John. Habitats
Carson-Dellosa Publishing Company, 1994

Mound, Laurence. Eyewitness Books: Insects
Dorling Kindersley, 1995

Parker, Nancy & Wright, Joan. BUGS
Scholastic, Inc., 1987

Rezendes, Paul. Tracking & the Art of Seeing
How to Read Animal Tracks & Sign
Camden House, 1992

Selsam, Millicent. How To Be a Nature Detective
Harper Collins, 1995

Staffer, Carolyn & Erica, Fielder. CITY SAFARIS
Sierra Club Books, 1987

Suid, Annalisa. Super-Duper Science Incredible Insects
Monday Morning Books, Inc., 1996

Williams, Rozanne. Ecology for Kids
Creative Teaching Press, Inc., 1991

**Recommended Literature Books
For Simulated Science Camp
Thematic, Unit 4**

Aardema, Verna. Why Mosquitoes Buzz in People's Ears
Scholastic, Inc., 1975

Bash, Barbara. Tree of Life: The World of the African Baobab
Little, Brown Company, 1989

Carle, Eric. The Grouchy Ladybug
First Harper Trophy Edition, 1977

Carle, Eric. The Honeybee and the Robber
Scholastic, Inc., 1981

Carle, Eric. The Very Quiet Cricket
Scholastic, Inc., 1990

Cherry, Lynne. The Great Kapok Tree
Harcourt Brace & Company, 1990

Cole, Joanna. The Magic School Bus
Butterfly and the Bog Beast
Scholastic, Inc., 1996

Cole, Joanna. The Magic School Bus
Inside a Beehive
Scholastic, Inc., 1996

Day, Jenifer. What Is an Insect?
Western Publishing Company, Inc., 1975

Demuth, Patricia. Those Amazing Ants
Macmillan Publishing Company, 1994

Dorros, Arthur. Ant Cities
Harper Collins Publishers, 1987

Hasely, Dennis. My Father Doesn't Know About the Woods and Me
Macmillan Publishing Company, 1988

Hiscock, Bruce. THE BIG TREE
Macmillan/McGraw-Hill School Publishing Company, 1991

McLerran, Alice. The Mountain that Loved a Bird
Macmillan/McGraw-Hill School Publishing Company, 1985

Hubbard, Fran. A Day With TUPI
Awani Press, 1978

Jim, Deep River, Sierra Campfire Yarns Tales, Skits & Songs
Father/daughter Press, 1996

Lauber, Patricia. Who Eats What?
Harper Collins Publishers, 1995

Losi, Carol. The 512 Ants On Sullivan Street
Scholastic, Inc., 1997

Mazer, Anne. The Salamander Room
Alfred, Knopf, Inc. 1991

Peet, Bill. The Whingdingdilly
Houghton Mifflin Company, 1970

Pinczes, Elinor. One Hundred Hungry Ants
Scholastic, Inc., 1993

Retan Walter. Armies of Ants
Scholastic, Inc., 1994

Rose, Deborah Lee. The People Who Hugged The Trees
Roberts Rinehart, Inc., 1990

Ward, Lorraine. A Walk in the Wild Exploring a Wildlife Refuge
Charlesbridge Publishing, 1993

White, E.B. Charlotte's Web
Scholastic, Inc. 1952

Zoehfeld, Kathleen. Ladybug at Orchard Avenue
Soundprints, 1996

APPENDIX B
Implementation of Camp

Preparing for Camp

3 weeks before camp:

1. Start working on Environmental Activities of your own or the ones that were provided.

2 weeks before camp:

1. Send letter home explaining to parents what the camp is all about and things that will be needed.
2. Start collecting paper rolls, white T-shirts, and fitted twin sheet.
3. Look for any activities about insects or bugs.
4. Look for any activities about the forest animals.
5. Send Silverwood Lake field trip form and walking field trip form home.

1 week before camp:

1. Make binoculars using paper rolls, yarn, and construction paper.
2. Put emblem on white T-shirts. Try to get a parent to help you do this.
3. Make a poster of the camping rules to be used on the first day of camp.
4. Check out books about insects, forest animals, and Native American Legends.
5. Check to see if students have dome tents they might want to use at the camp.
6. Make a journal for each child. Have them decorate it with things found in nature. Have them place the items on the front cover of the journal and write their names. Put large clear tape over the items.
7. Review trail (Discovery, Forest, Wildlife, Geology, Museum) you will be guiding. Make sure you have the necessary materials.
8. Collect letters from the students' parents.
9. Run-off Insect Report Form.
10. Make Camp Crawly Critters hats and badges.
11. Collect field trip form and walking trip form.
12. Collect foods for trail mix.
13. Get ingredients for S'More and the largest bag of fruit loops you can get.
14. Get sandpaper for sanding tree cookies.
15. Get material to make a fake campfire (firewood, red cellophane, flashlight).
16. Get corn husks and feathers for Pok Key.
17. The Friday before camp remove desk and chairs from your room if possible.

Parent Letter About Camp

_____ ,19

Dear Parents,

On _____ some of the classes at our school will be participating in an imaginary outdoor camp called Camp Crawly Critters. We will be turning our classrooms into a summer camp; using our desks as tents or replacing them with real tents. Students will not be spending the night.

The purpose of exposing the students to this type of camp is to raise their level of appreciation for, and their awareness of, the outdoors. At camp, they will continue to develop their academic skills of reading and writing, maintain and improve their social skills, engage in physical educational activities, develop skills in fine arts; and most of all, have fun learning about the Earth and the world around them. Some of the activities are: math fun, nature design, scavenger hunt, P.E. games, writing letters to parents, flying contest, bubble fun, reading books, marshmallow hunt, performing skits, singing, and hiking. Trail hikes will include the Geology Hike, the Wildlife Hike, the Discovery Hike, and the Picnic Hike.

In order to make this camping experience fun for all, I would like parents to help their child collect and bring the items listed below by _____ (**Note: item #5 needs to be brought in by _____ or sooner, so we can design our shirts with the emblem, Camp Crawly Critters).**

1. blanket or sleeping bag
2. pillow
3. books
4. stuffed animal (optional)

5. a plain white T-Shirt

6. a letter in an envelope, from the parent to their home-sick child at Camp Crawly Critters. Our imaginary address is: Camp Crawly Critters
1234 Insect Rd.
Bug City , CA.. 56789

7. A bag filled with one or the items below for making a trail mix:

shelled peanuts
coconut flakes
banana chips
chocolate chips
raisins

Contact your child's teacher, before or after school, if you have any questions. Thank you for your cooperation. We hope your child enjoys their stay at Camp Crawly Critters.

Sincerely yours,

Camp Crawly Critters Schedule for Five Classes

Animals Around Us

Monday

9:00 - 9:30

- * March out to flag pole chanting "CCC March."
- * At the flag pole as a whole group say the Pledge Allegiance.
- * Individual classes takes roll by calling students' name loudly. Students that are present will call out "Camp Crawly." Pick one student to run to the office picking his/her knees up high and raising the folder high in the air.
- * March out to the playground to do some exercises (each class can do their own).

9:30 - 10:30

- * In classroom establish and discuss camping rules (these rules can be written out ahead of time and posted in class).

Camping rules:

1. Tents will be neat and organized.
 2. Tents will remain opened so that campers can be observed.
 3. Campers will read or play quiet games in their individual tents.
 4. Campers will be polite and respectful to other campers.
 5. Campers will share.
 6. Campers will be helpful.
 7. Campers will talk quietly.
- * Set up tents. This can be done by turning desks on their sides and stretching a fitted sheet across the top or by stretching a fitted sheets across two empty book shelves. Small dome tents that fit 3-4 people work the best.
 - * After setting up tents assign tents to 3-4 students.
 - * Meet with students by the campfire. Discuss the difference between a bug and an insect. Brainstorm a list of insects students would like to learn about. The list should be written on large paper to be posted in the room.
 - * Each tent group needs to decide which insect their group would like to report on. The group will name their tent after the insect they will be studying.
 - * Campers will be provided with materials to make a banner representing their insect to hang on their tents. Banners can be made out of large construction paper. The construction paper can be cut into the shape of the insect. Yarn can be used to hang the banner.
 - * Resource books and materials will be provided for students' research.

10:30 - 10:45 Recess

10:45 - 11:45

- * School Yard Safari (taken from PLT). See handout and have students use their binoculars for this activity.

11:45 - 12:15

- * Read some insect stories to the class. Make up a class poem about insects and post in the class.

12:15 - 1:00 Lunch

1:00 - 1:10

- * Get campers ready to go to the M.U. room for a presentation on animals in the forest. Sit around the camp fire. Tell students that in our environment many of the animals we see are insects. The types of animals that live on the land depend on its environment. When the environment changes, so does the type of animals that live there. Today we will be going to the forest to see the animal life that live there.

1:10 - 1:15

- * Walk campers to the M.U. room chanting the "CCC March."

1:15 - 2:15

- * **Children's Forest presents Forest Animals**

2:15 - 2:30 Recess

2:30 - 3:30

- * Through the Forest (P.E. Activity).
Have the children pretend to be different animals of the forest. Before they begin discuss the different ways animals move. Encourage them to fly like birds, scamper like chipmunks, leap gracefully like deer, lumber along like bears and be sly like foxes. Form a circle. Pick some students to get inside the circle. Ask a student to name an animal of the forest. The students inside the circle will pretend to be that particular animal. Do this activity again with other animals of the forest until all campers have had a chance to pretend.
- * Art lesson:
Inside the classroom teach the students to draw forest animal.
Rest in tents while reflecting on the events of the day. Reflections are written in their journals.
- * Sing around the campfire.

Take a Hike

Tuesday

Discovery Trail

Objective:

To become familiar with the forest ecosystem and how it works.

Activity: Food Chain Activity

Forest Trail

Objective:

To compare the relationship between non-living factors and plant growth in the forest.

Activity: Tree Cookies (study of the tree rings).

Wildlife Trail

Objectives:

To explain the relationship of animals in their habitat.

To describe the influences on animal population.

To become a tracking artist.

Activity: Take a Walk on the Wild Side

Geology Trail

Objective:

To study the structure of the Earth.

Activity: The Earth is Old (Make a timeline, read "How Mountains Are Made," simulate an earthquake and volcano.)

Museum Trail

Objective:

Investigating diversity and adaptation.

Activity: Charting Diversity (from PLT #10)

Directions for Rotating Five Classes:

1. Divide each class into five groups (A,B,C,D, E).
2. Five teachers are required; one to lead each trail.

Schedule for Rotation:

	A	B	C	D	E
1. 9:00 - 10:00	Discovery	Forest	Wildlife	Geology	Museum
2. 10:00 - 10:30	Forest	Wildlife	Geology	Museum	Discovery
3. 10:45 - 11:15	Forest	Wildlife	Geology	Museum	Discovery
4. 11:15 - 12:15	Wildlife	Geology	Museum	Discovery	Forest
5. 1:05 - 2:05	Geology	Museum	Discovery	Forest	Wildlife
6. 2:30 - 3:30	Museum	Discovery	Forest	Wildlife	Geology

Insects, Insects and More Insects

Wednesday

- * Routine opening like Monday.
- * Presentation on Insects from the San Bernardino County Museum.

9:15 - 10:15 Two participating classes
10:45 - 11:45 Three participating classes

- * When campers are not at assembly they should be working on their insect reports (see reporting all insects).
 - * The Peppermint Beetle (from PLT #3).
- 11:45 - 12:15 Writing Home and reading mail from parents.
12:15 - 1:00 Lunch
1:00 - 1:25 Silent reading and writing in journals in tents. Environmental books are preferred.
1:25 - 2:15 Practice Insect skits
2:15 - 2:30 Recess
2:30 - 3:30 Sing-Along

Survival and Camping

Thursday

9:00 - 9:15

- * Routine Opening.
- * Bathroom check, lunch check, equipment check, attendance check, and first aid check.

9:15

- * Bus leaves to Silverwood Lake.

10:00 - 3:30

- * Survival tips
- * Proper camp set-up
- * Making tracks
- * Studying wildlife
- * Lunch
- * Life Guard rescue
- * Swimming

Native American Trail

Friday

9:00 - 9:15

- * Routine Opening
- * Bathroom check, lunch check, equipment check, and first aid check.

9:15 - 11:00

- * Trip to park for Native American Trail

11:00 - 2:30

- * Set up Stations, materials needed:

Face Painting & Friendship Necklace Station

music
watercolor(choose a bug to paint on face)
Q-tip
blankets
fruit loops
string or yarn

Indian Games Station

sticks
feathers
stones
sack races
Pok Key

Hike up a Hill Station

looking for evidence of animal life
collection materials to make collage
glue, paper plates, pencil

Scavenger Hunt & Tree Rubbings

lunch bags
scavenger hunt lists

Bubble Fun & Storytelling Time

dawn
pail or pan
water
paper rolls
Indian Legends

2:30 - 3:30

- * Write reflections in Journal.
- * Make Trail Mix together. Eat trail mix and S'More Bars while sitting around the campfire. Sing some camp song.

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