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Planting the seeds of environmental sensitivity using children's literature

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PLANTING THE SEEDS OF ENVIRONMENTAL SENSITIVITY USING CHILDREN'S LITERATURE

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

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March 13, 2006
Date

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ABSTRACT

This project is aimed at helping children in elementary grades 1-6 develop a deep awareness of and empathy for the environment through children's fictional literature. This project takes a selection of children's books that encourage feelings of love, respect, and concern for the environment, and pairs them with an array of activities that put children more in touch with our planet and its problems. This combination of shared stories and related activities may be influential in developing environmental sensitivity in young children.

ACKNOWLEDGEMENTS

I would like to thank Dr. Darleen Stoner for her generous attention to my project, and for planting and nurturing so many new seeds of environmental awareness, for me and for other eager environmental educators. My family, Linda, Dale, and Eric, thank you for your constant love, support, patience, and encouragement, and for making this possible in countless ways, every day. And John, thank you for being you and loving me.

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CHAPTER ONE

INTRODUCTION

The environmental problems that confront us today are as varied as they are troubling. Global warming, habitat destruction, loss of biodiversity, pollution, urban sprawl, and resource depletion, just to name a few, are current problems that at times seem insurmountable. At the same time, it seems environmental awareness is steadily increasing. Clearly, the future of our planet will depend largely on the degree to which our children become environmentally aware, respectful of our planet Earth, and sensitive to the quality of the natural world. This task is large, but children are naturally suited for this challenge. They enter life with a sense that the world is inherently good, beautiful, and fascinating. Therefore, the way in which children are brought into contact with nature and the environment can either enhance these attitudes or destroy them. For parents and educators, the primary role models for young children, the goal is not to overwhelm and frighten children with environmental dangers, but rather to provide them with opportunities to maintain this sense of wonder and develop

an environmental sensitivity or empathy for the environment.

This project is designed for educators aiming to help children develop a deep awareness of and empathy for the environment through children's literature. The natural curiosity of children about the world and their place in it can be supported and nurtured by combining the visions and messages offered on the pages of imaginative books with a variety of activities that immerse children in the natural world. Children's literature has been recognized as an important vehicle through which to expose students to environmental issues. Because children are naturally curious about their surroundings, the environment is the perfect stimulus for their learning to read, write, and make sense of their world.

It is my hope that this project will serve as a valuable resource for both traditional and nontraditional educators looking to integrate and implement environmental education. This project contains an array of children's activities that puts them more in touch with our planet and its problems, as well as, the people, plants, animals, and resources which make up our world. More importantly, it identifies children's literary resources that could help a child develop feelings of love, respect, and

concern for the environment. Lastly, the stories and activities included in this project ask the children to think critically about environmental issues. This is the beginning of environmental literacy, which can lead to successful environmental problem solving in the future. It is this combination of shared stories and related activities that may be most influential in developing environmental sensitivity in young children.

CHAPTER TWO

REVIEW OF THE LITERATURE

This project is aimed at helping children in elementary grades 1-6 develop a deep awareness of and empathy for the environment through children's fictional literature. This project contains an array of children's activities that put them more in touch with our planet and its problems, and it identifies children's literary resources that could help a child develop feelings of love, respect, and concern for the environment. This combination of shared stories and related activities may be influential in developing environmental sensitivity in young children. The literature reviewed here provides a rationale for this combined approach. The literature review examines and explores the three following topics: understanding environmental education, understanding environmental sensitivity, and the use of children's literature.

Understanding Environmental Education

A continuing dilemma for those concerned with environmental education lies in the matter of definition. While unanimity of agreement concerning the definition of

environmental education has yet to be reached, there are many groups and individuals who have forwarded a variety of definitions and statements. Of these definitions and statements put forth, very few have be as widely embraced and accepted within the environmental education field as the definition developed by Dr. William Stapp and his University of Michigan colleagues in 1969. Even though this paper was published well over 30 years ago, Dr. Stapp was considered far ahead of his time. The paper, which put forth the definition and major objectives of environmental education, remains consistent with, and even serves as a foundation for, many of the environmental education ideas found in contemporary literature. Dr. Stapp and his colleagues (1969) defined environmental education as follows:

> 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)

In October 1977 the world's first Intergovernmental Conference on Environmental Education, organized by UNESCO in cooperation with the United Nations Environmental Programme, was convened in Tbilisi, Georgia, USSR. The conference resulted in the release of the Tbilisi Declaration, which is considered one of the most important seminal documents in environmental education today. The Tbilisi Declaration lent great credibility and understanding to the field of environmental education by setting forth the goals, objectives, and guiding principles for environmental education. Demonstrating some overlap with Stapp's definition of environmental education, the Tbilisi Declaration endorsed the environmental education objectives of awareness, knowledge, attitudes, skills, and participation, and outlined the following goals of environmental education:

- To foster clear awareness of, and concern about, economic, social, political and ecological interdependence in urban and rural areas;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment;

- To create new patterns of behavior of individuals, groups and society as a whole towards the environment. (The Tbilisi Declaration, 2001, p.15)

Understanding Environmental Sensitivity

Environmental sensitivity has received increasing attention in the field of environmental education today. This term first appeared in educational literature in the 1970s, but it was not well understood and, therefore, could not be clearly defined. While there is still no agreed-upon definition for the term "environmental sensitivity," numerous attempts have been made by professionals, experts, and researchers in the field of environmental education to simplify this term and make it more widely palatable within the field. In 1974 Dr. William Stapp addressed the issue of environmental sensitivity without actually defining it. He clearly referred to environmental sensitivity as the "exposure to, exploration of, appreciation of, and respect for the environment" (Sward & Marcinkowski, 2001, p. 278). Others have simply replaced the word "sensitivity" with verbiage that appears less ambiguous, including, concern, literacy, and empathy. Despite the ongoing definitional

dilemma surrounding environmental sensitivity, there has been a general acceptance of the term "environmental empathy" to define and clarify environmental sensitivity.

In 1998, Sward and Marcinkowski published an article summarizing the research on environmental sensitivity between 1980 and 1995. In addition to their findings that environmental sensitivity was most frequently defined as "a set of affective characteristics that result in an individual viewing the environment from an empathetic perspective," they were also able to present some variables that contributed to the formation of environmental sensitivity (Sward & Marcinkowski, 2001, p. 279). The variables presented included, outdoor experience, favorable interactions with people (i.e., parents, educators, and other role models), and knowledge about the natural environment. These variables were originally identified by N. T. Tanner and M. Peterson and the early 1980s when they used a combination questionnaire and interview technique to assess environmental sensitivity. While outdoor experience, favorable interactions with people, and knowledge about the natural environment were the most significant contributors to the formation of environmental sensitivity, Tanner and Peterson identified at least one variable with relevance

to this project. In a study of 45 participants they found that books contributed about 29% to the formation of environmental sensitivity (in Sward & Marcinkowski, 2001, p. 280). These results suggested that using literature, including children's fictional literature, to foster environmental sensitivity in young children can be a valuable and effective tool for environmental educators.

Use Of Children's Literature

Over the last several years we have seen a growing awareness of and emphasis on our relationship with the Earth. As a result of this, children are being presented with environmental issues in a variety of settings, including the classroom. For educators the challenge lies in trying to find creative and effective ways of integrating environmental education into the current standards-based curriculum. One approach that has gained recent acclaim is the use of children's literature to teach and better understand environmental themes and issues. Mayer (1995) suggested this approach is being readily adopted by teachers because fiction books can be integrated into whole language and thematic curricula, and because fiction and trade books are widely available. Still, the question remains: Is the use of children's

literature an effective way of assisting students in developing sensitivity to nature and an understanding of environmental issues?

Upon completion of a yearlong, qualitative study that involved an action-inquiry group of five elementary school teachers who used children's literature to discuss different perspectives on environmental issues, Christenson (2004) concluded that classroom teachers who used children's literature to explore environmental issues perceived an increase in and more accurate use of environmental vocabulary from their students.

After reviewing several children's books, including, Antler, Bear, Canoe: A Northwoods Alphabet Year by Betsy Bowen, A Look Around the Rain Forests by Ed Perez, Owl Moon by Jane Yolen, and the well-known Kapok Tree by Lynn Cherry, Eggerton (1996) concluded that literature books can indeed convey environmental and nature-related information in ways that foster sensitivity and curiosity. Wilson (1993)advocated the use of children's literature as a valuable resource in promoting positive attitudes about the environment in her guide, "Fostering a Love of Nature Index," which provides guidelines for planning, implementing, and evaluating environmental education programs for young children. O'Brien and Stoner (1988)

stated that carefully selected literature can help students understand environmental concepts and can generate interest in the natural environment. Sheehan and Waidner (1998) lent further support when they wrote that one of the most important approaches for the alteration of one's attitudes and lifestyle towards living in harmony with the Earth is one of empathy, which can be accomplished by reading imaginative books.

Despite the lack of quantitative data supporting the use of children's literature to teach environmental concepts and develop environmental sensitivity, there is clearly a niche and an interest in using this approach in the classroom. After reviewing 1,074 nature-related picture books, Marriott (2002) was unsure about the influence these books would have on a child's developing sense of the natural world and their place within it, but she emphatically believed that integrating literature into environmental education would be "a contribution worth making" (Marriot, 2004, p. 183).

The literature reviewed here provides a rationale for using children's fictional literature to spark and nurture the formation of environmental sensitivity in young children. By combining literature with related, hands-on activities, we can put children more in touch with our

CHAPTER THREE

GOALS AND OBJECTIVES

The goal of this project was to select a handful of children's fictional books with environmental themes, topics, and issues, which in turn would inspire the creation and implementation of hands-on activities intended to put young children more in touch with our planet and its problems, as well as, the people, plants, animals, and resources which make up our world. In order to accomplish this goal, the following objectives had to be met:

1. Select nine children's fictional books with a variety of environmental themes, topics, or issues.
2. Select and develop a series of activities for young children that incorporate and reinforce ideas and concepts found in each book.

CHAPTER FOUR

DESIGN OF PROJECT

This project was inspired by a whimsical and endearing, yet thought-provoking and ethics-challenging children's book that follows an ant whose fate rests in the hands of one young boy. This simple book, Hey, Little Ant, by Phillip and Hannah Hoose (1998), revealed the potential and magic in using fictional literature to put children more in touch with our planet and its problems, and to plant and nurture the seeds of environmental sensitivity, those feelings of love, respect, and concern for the environment.

The literary sources included in this project are truly the heart or the focus of the project. A lot of time and consideration went into selecting each of the children's books that eventually ended up in this project. This author felt very strongly about including books that addressed a variety of environmental themes, topics, and issues in powerful and lasting ways. There was also an interest in looking for books that elicited an emotional response from its readers, and served as a springboard or inspiration for personal action and involvement. From well over 100 titles, the list of potential books was

whittled down to just a handful. The nine children's books that were used in this project include: Silver Seeds by Paul Paolilli and Dan Brewer (2001), Under One Rock: Bugs, Slugs and Other Ughs by Anthony D. Fredericks (2001), Hey, Little Ant by Phillip and Hannah Hoose (1998), Once There Was a Tree by Natalia Romanova (1985), Storm on the Desert by Carolyn Lesser (1997), Everglades by Jean Craighead George (1995), EarthDance by Joanne Ryder (1996), Where Once There Was a Wood by Denise Fleming (1996), and The Little Creek by Jennifer Ward (2005).

While the criteria for the project book list were firmly established, figuring out how to bring some cohesiveness and order to this list proved to be quite a challenge. For this, the author used the expertise and the example set forth by Patti Sinclair (1992) in her annotated bibliography of children's books with environmental themes, entitled, E for Environment. In her bibliography Sinclair divided children's books into five sections. The sections followed what many envision to be the perfect flow in environmental education. She began with books that evoked a sense of wonder at the natural world, and ended with books that encouraged involvement in nature and the environment.

From Sinclair's five sections the author chose to borrow and modify three of these sections to organize this book list. The first three books included in this project were grouped together under the heading: Planting the Seeds of Environmental Awareness (Appendix A). These three books, Silver Seeds, Under One Rock: Bugs, Slugs, and Other Ughs, and Hey, Little Ant, inspired children to develop a sense of wonder at the natural world, and more importantly, they encouraged empathy and respect for all life. The next three books included in this project, Once There Was a Tree, Storm on the Desert, and Everglades, were grouped under the heading: Nurturing the Seeds of Environmental Awareness (Appendix B). These books explored how living things interact with each other and their physical environment. Once children had a basic understanding of ecology and its principles, they could better understand environmental issues and problems. The last three books included in this project, EarthDance, There Once Was a Wood, and The Little Creek, were brought together under the heading: The Human Connection: People and Nature (Appendix C). These books focused on people's relationship with and attitudes towards the environment, while reminding children of their responsibility to care for and protect the Earth and all living things. The

sequencing, as it is set up within the project, was effective in developing environmental sensitivity because it started by engaging children in the natural world; they were observing, wondering, and experiencing emotional responses to the environment. It then moved to the education level; the children were learning more of the science and hard facts about the environment. Finally, the sequence concluded by motivating children to become involved in learning about and caring for the Earth, our home.

Once the difficult decision was made about what books to include, the second part of the project was to prepare activities that incorporated and reinforced the ideas and concepts addressed in each of the books. While a couple of activities were original creations, most of the activities prepared for each book were adapted from a variety of guide and lesson books containing environmental and nature-related activities.

The group of activities prepared around the book, Silver Seeds, is unique because it reflects the philosophy of one man renowned in the field of environmental education. Joseph Cornell, author of several nature activity books, including, Sharing the Joy of Nature (1989), has established his own teaching philosophy known

as Flow Learning. Flow Learning is the blending of four stages of learning into one outdoor experience. The four stages of learning include: Stage One: Awakening Enthusiasm, Stage Two: Focusing Attention, Stage Three: Directing Experience, and Stage Four: Sharing Inspiration. During stage one, the aim of the activity or experience should be to foster an intense flow of personal interest and keen alertness in the natural world. Stage two activities and experiences should seek to channel enthusiasm into a calm focus so that learners can be more dynamically aware of nature. By stage three, learners should be participating in activities and experiences that make them more sensitive to the rhythm and flow of nature. They should be experiencing nature directly through sight, sound, touch, and smell. Lastly, stage four activities and experiences should open the learner up to a deeper awareness. They may experience feelings of joy, happiness, or an overwhelming sense of beauty, and they should be inspired to share their own stories about the natural world (Cornell, 1989).

To incorporate and model Flow Learning for other educators seeking to challenge or change their outdoor teaching style, the author selected activities representing each of Cornell's four stages of learning.

CHAPTER FIVE

IMPLICATIONS FOR EDUCATORS

Many educators believe that young children posses inherent feelings of care and compassion when it comes to the natural world and other living creatures. However, in order for them to develop a deep respect and awareness for the Earth, the quality of our children's environmental awareness and their sense of wonder at the natural world must be supported, guided, and encouraged.

This project was created to help educators share the wonder that a deep awareness of the environment can bring. Through activities and children's books, chosen specifically for their unique way of looking at the world, educators can share stories and activities with children that remind them of the beauty, complexity, and fragility of the Earth, and that it is our responsibility to care for it. Young children may not be able to stop environmental problems like deforestation and pollution, but they can become aware of the majesty of a giant redwood tree, the crispness of a winter day, and the sight and sound of a mountain stream bubbling and tumbling over rocks. This is where environmental education begins, with awareness and sensitivity, a love of the Earth, which,

when planted and nurtured during youth, will grow with the children into adulthood.

This project in its entirety was developed with nontraditional educators (i.e., park rangers, park guides, recreation leaders, naturalists, camp leaders, scout leaders) in mind. However, it can easily be adopted by and adapted to a variety of settings (indoor, outdoor, classroom, nature center), and to meet a variety of educator needs and learner outcomes. The children's books included in this project are just a few of the many wondrous stories out there that touch upon the natural world, and the activity portion of this project presents only a small handful of activities and resources available to environmental educators.

The author challenges and encourages anyone wishing to use or draw inspiration from this project to be creative. Find books and activities that speak to you, and use them to plant and nurture the seeds of environmental awareness.

APPENDIX A

PLANTING THE SEEDS OF ENVIRONMENTAL AWARENESS

Natural Wonders

Literary Inspiration

Title: Silver Seeds

Author: Paul Paolilli & Dan Brewer

The world is full of wondrous things. This book invites the reader to take a look at the world through new eyes. Are those stars you see, or are they silver seeds tossed in the air?

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

none

Learner Outcomes and Skills

group cooperation, drawing connections, role playing, sense of audience, observation skills

Overview

The children's game Charades has been popular through the years. This activity capitalizes on the popularity of this game by having children create and share a natural environment for others to guess. Children who participate in this activity learn to associate plants and animals with their environments. This activity makes it easier for them to understand how various elements interact with one another to form communities of living and non-living things. Additionally, the camaraderie of the activity helps create a bond within the group.

Activity

After dividing the children into groups of five, secretly tell each group the environment that they will act out. Some suggestions for environments that are relatively easy to act out are: beach, forest, meadow, mountain, desert, and rainforest. Allow time for all groups to discuss and plan their acts. Each child within the group will choose a component within the environment to play, such as a plant, animal, or physical feature. The habitat group will decide how each part will work within the act.

When all groups have had time to plan and practice their presentations, call all groups back together. While each group performs, the children in the audience watch. Once the performance is complete, have the audience guess which habitat (environment) was presented. Before the players leave the stage, have each participant introduce the

character/component he portrayed. For younger children consider using words from the book, Silver Seeds, to act out in small groups for an audience. The audience will try to guess the natural wonder being presented.

Adapted from Cornell, J. (1989). Sharing the joy of nature. Nevada City, CA: Dawn Publications.

Tickling the Senses

Literary Inspiration

Title: Silver Seeds

Author: Paul Paolilli & Dan Brewer

The world is full of wondrous things. This book invites the reader to take a look at the world through new eyes. Are those stars you see, or are they silver seeds tossed in the air?

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- box or sack of examples from nature collected at discovery site (rocks, leaves, cones, feathers, etc.)
- audiotape of wildlife sounds
- audio player
- clipboards
- Tickling the Senses Handout

Learner Outcomes and Skills

observation, classification, deductive reasoning, heightened awareness of senses

Overview

Children need opportunities to use their senses to gather information. As they use their senses in a variety of situations, they become more efficient in scientific explorations. This activity, which incorporates not only the sense of sight but the senses of touch, hearing, and smelling, as well, expands the world of nature for children.

Activity

Part 1: Practicing With the Senses

Before exploring your discovery site, give the children an opportunity to focus on and practice with their senses. Collect natural objects that have definite texture and smells and place them in a bag or box. Ask children to guess what the textured objects are using only their sense of touch. Briefly brainstorm and record words that could be used to describe how the objects feel.

Repeat this procedure substituting items that can be identified using the sense of smell. List adjectives that describe these smells.

Finally challenge the children to use their sense of hearing to identify and describe nature sounds that have been pre-recorded for this purpose.

Part 2: Outdoor Exploration

Before moving outdoors to the area you've chosen for exploration, review the expectations you have for outside behavior. Explain the handout and review words that could be used as descriptors for the various senses.

Select three different outdoor sites and divide the children into smaller groups to rotate through the various sites. Remind them to be focused and quiet in order to discover as much as possible.

Part 3: Group Reflections

As a group, when data collections are complete, list discoveries and the words used as descriptors that provide vivid images. Discuss the difficulty of identifying sounds and smells. Discuss the conditions that are necessary for good observations.

Adapted from Glock, J., Wertz, S., & Meyer, M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Tickling the Senses Handout

Name _____

What do you see?

Site 1	Descriptors
Site 2	Descriptors
Site 3	Descriptors

What do you hear?

Site 1	Descriptors
Site 2	Descriptors
Site 3	Descriptors

What do you smell?

Site 1	Descriptors
Site 2	Descriptors
Site 3	Descriptors

What do you feel?

Site 1	Descriptors
Site 2	Descriptors
Site 3	Descriptors

Adapted from Glock, S., Wertz, M., & Meyer, M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Camera

Literary Inspiration

Title: Silver Seeds

Author: Paul Paolilli & Dan Brewer

The world is full of wondrous things. This book invites the reader to take a look at the world through new eyes. Are those stars you see, or are they sliver seeds tossed in the air?

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- index cards
- pencils

Learner Outcomes and Skills

aesthetic appreciation, trust, seeing clearly, cooperation

Overview

Cameras are magical, intriguing tools to children. They love to take pictures, develop them, and share them with others. Cameras can capture the wonder and beauty and uniqueness of all that nature has to offer. Using a camera can focus and quiet the senses and can free the attention of the photographer to absorb nature with a special clarity. This activity will allow children to view nature in a most enjoyable and focused manner.

Activity

Part 1: Photo Shoot

Have the children work in pairs. One child will be the photographer; the other child will be the camera. The photographer will guide the camera who keeps their eyes closed, on a search for beautiful and interesting pictures. When the photographer sees something they like, they point the camera's "lens" (eyes) at it, framing the object they want to "shoot." Then the photographer presses the shutter button by either tapping the camera's shoulder or the flap of cartilage at the front of the ear if the children are old enough. The preferred exposure time is three to five seconds so the picture is not "overexposed" (so the camera's mind does not wander). A second tap on the shoulder (or ear) tells the camera to close their eyes. No talking is necessary.

Encourage the photographer to be creative in choosing and framing pictures. Encourage shots taken from unusual angles and perspectives. Shots can be taken by lying down and shooting up or by putting the camera very close to an object. Encourage the photographers to look down into a flower or pan the horizon or an object like a tree from bottom to top (exposure time will increase when panning).

Have photographers prepare the camera for the next picture by telling them which lens to use. For a picture of a flower, the camera should use a close-up lens; for panoramic shots, a wide-angled lens is appropriate; and for objects far away, a telephoto lens is best.

Have photographers move their cameras carefully and safely by holding the camera's hand and gently pulling the arm in the direction the photographer plans to go.

Allow ten minutes for the photographer to take six to ten pictures, and then have them trade places with their partners.

Part 2: Developing Photos

After everyone has had an opportunity to be both the photographer and the camera, give each child a 3" x 5" index card and a pencil and have them "develop" a picture they took while they were the camera by drawing it on the card. Share the favorite photograph with the photographer.

The activity can be extended by asking the group to write about the picture they took.

Adapted from Cornell, J. (1989). Sharing the joy of nature. Nevada City, CA: Dawn Publications.

The Poetry of Nature

Age Group

intermediate (grades 3-5)

Materials

- paper
- pencils

Learner Outcomes and Skills

creative thinking and writing, keen observation skills, appreciation of nature

Literary Inspiration

Title: Silver Seeds

Author: Paul Paolilli & Dan Brewer

The world is full of wondrous things. This book invites the reader to take a look at the world through new eyes. Are those stars you see, or are they sliver seeds tossed in the air?

Overview

Writing a poem is a personal way for children to become more aware of the natural wonders surrounding them. Taking the time to notice the sounds, movements, textures, and colors present in a special piece of nature provides the emotional and physical connection needed to express appreciation and awe for the natural world.

Activity

Have each child choose a word that names a special and unique part of nature. Have them spell the word vertically using capital letters. Use each capital letter to begin a line of the poem.

Slivers of warm, golden light
Usher the clouds away and
Nudge us out to play.

Adapted from Cornell, J. (1994). Journey to the heart of nature. Nevada City, CA: Dawn Publications.

Discovery Site Scavenger Hunt

Literary Inspiration

Title: Under One Rock: Bugs, Slugs, and Other Ughs

Author: Anthony D. Fredericks

What's under a rock on a warm summer day? A little boy decides to find out and discovers a whole community of amazing creatures.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- clipboards
- pencils or crayons
- hand lenses (optional)
- Discovery Site Handout

Learner Outcomes and Skills

observation skills, data collection, geometric shapes can be found in nature

Overview

Have you ever spent a lazy summer afternoon lying in the grass, watching the clouds drift on by, and smiling and exclaiming when one particular cloud looks like a heart or a face? Often, circles, squares, triangles, and other shapes can be found in nature. This activity encourages children to look closely at the outside environment and to distinguish among objects found in nature based on their color and shape.

Activity

Distribute copies of the Discovery Site Handout and clipboards to each of the children. Allow the children to explore the designated outdoor site. As the children roam about, they will be locating natural objects that match the descriptions on the handout. When they find an object, they will write it down and draw a picture of it on their handout.

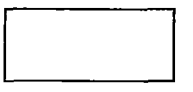
Have the children re-group and discuss their findings. They can share their most interesting object, their favorite shape or color, or they can count all the objects they found for each color and shape.

Adapted from Glock, J., Wertz, S., & Meyer, M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Discovery Site Scavenger Hunt Handout

Name _____

Find an object in nature that fits each of the descriptions in the following boxes. Draw a picture of that object in the appropriate box below.

Green	**Square** 
Brown	**Circle** 
Yellow	**Triangle** 
Black	**Rectangle** 

Adapted from Glock, J., Wertz, S., & Meyer, M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Sample Study Sites

Literary Inspiration

Title: Under One Rock: Bugs, Slugs, and Other Ughs

Author: Anthony D. Fredericks

What's under a rock on a warm summer day? A little boy decides to find out and discovers a whole community of amazing creatures.

Age Group

intermediate (grades 3-5)

advanced (grades 6-7)

Materials

- clipboards
- pencils
- hand lenses (optional)
- quadrant data sheet

Learner Outcomes and Skills

to observe and categorize items found in a marked area, observation skills, data collection

Overview

When ecologists study a particular ecosystem or habitat, they usually don't have the time and resources to study everything in the area, so they select small areas to study closely. These small areas are called sample study sites. This activity reinforces observation skills by getting children to investigate one small area in depth.

Activity

Guide children to a spot outside where they will likely find a variety of natural creatures and objects. In small groups, have them construct quadrants with string. Their quadrants should consist of nine, 10" squares, or as close as possible. The children will then count and record on their data sheets what they see in their quadrants.

Gather as a group to share results. Record at least one object from each group's quadrant to give the children an idea of what is representative of the larger area.

Adapted from Glock, J., Wertz, S., & Meyer, M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Sample Study Sites Handout

Name

_____

Using your string, make a square on the ground. Pick a place that has a variety of objects. In the corresponding sections of your handout, draw in the things as you discover them in your quadrant.

Draw

Record

Discoveries					
Number					

Adapted from Glock, J., Wertz, S., & Meyer M. (1999). Discovering the naturalist intelligence: Science in the schoolyard. Tucson, AZ: Zephyr Press.

Insect Observation

Literary Inspiration

Title: Under One Rock: Bugs, Slugs, and Other Ughs

Author: Anthony D. Fredericks

What's under a rock on a warm summer day? A little boy decides to find out and discovers a whole community of amazing creatures.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- clipboards
- pencils
- hand lenses (optional)
- Insect ID Cards

Learner Outcomes and Skills

observation, counting, classification, sorting, scientific diagramming

Overview

If we were to put all the insects of the work on a scale, they would weigh more than all the people in the world! There are thousands of kinds of insects, many with unique and amazing survival strategies. This activity will challenge children to find out how many different kinds of insects inhabit an area and where they live.

Activity

Part 1: Insect Observation

Before the children begin exploring, hand out clipboards and Insect ID cards (2-4 per child). Remind the children to find out as much as they can about the insects in the area without harming the insects or their homes. Give the children time to observe and record their findings. They should fill out an ID card for each insect they find. Encourage the children to use descriptive words and to draw what they really see.

Part 2: ID Sorting

Have the children work in teams to sort their ID cards in different ways. Some examples of ways to group insects may include: spiders/not spiders, wings/no wings, brown/black, etc. After the groups have finished at least two sorts, gain the attention of the children and ask them to describe the results of their sorting.

Adapted from Barrett, K., & Willard, C. (1998). Schoolyard ecology grades 3-6: Teacher's guide. Berkeley, CA: Lawrence Hall of Science, University of California, Berkeley.

Insect ID Handout

Insect ID Date _____

Name _____

Kind of Insect _____

Describe it:

Draw it:

Insect ID Date _____

Name _____

Kind of Insect _____

Describe it:

Draw it:

Insect ID Date _____

Name _____

Kind of Insect _____

Describe it:

Draw it:

Insect ID Date _____

Name _____

Kind of Insect _____

Describe it:

Draw it:

Adapted from Barrett, K., & Willard, C. (1998). Schoolyard ecology grades 3-6: Teacher's guide. Berkeley, CA: Lawrence Hall of Science, University of California, Berkeley.

Who Lives Here?

Literary Inspiration

Title: Under One Rock: Bugs, Slugs, and Other Ughs

Author: Anthony D. Fredericks

What's under a rock on a warm summer day? A little boy decides to find out and discovers a whole community of amazing creatures.

Age Group

intermediate (grades 3-5)

Materials

- pencils, markers, or crayons
- insect field guides
- Who Lives Here? Handout

Learner Outcomes and Skills

Observation skills, basic research, appreciation of nature, understanding of an insect's basic needs

Overview

There are many kinds of major habitats in the world, including, deserts, forests, oceans, and mountains. Within these large habitat areas there are many smaller microhabitats that support small animals and insects. This activity will encourage children to think about microhabitats and the small creatures that inhabit them.

Activity

Pass out copies of the Who Lives Here? Handout to each child or group, depending on the number of children. Give each child or group time to use simple field guides and insect reference books to find out where insects live and what they look like. The children will need to find a type of insect that lives in each of the microhabitats listed on the worksheet. They will then fill in the name of the insect and what it eats and draw a picture of the insect. When everyone has finished, go through the worksheet and discuss each microhabitat and how it fills the food, water, shelter, and space needs of each insect. The discussion may also include how each insect is specially adapted to living in a certain microhabitat.

Adapted from Braus, J. (Ed.) (1985). Ranger rick's naturescope: Incredible insects. Washington, DC: National Wildlife Federation.

Who Lives Here? Handout

Name _____

Where It Lives	Its Name	What It Eats	What It Looks Like
In a tree			
In tall grass			
In a garden			
On a cactus			
In your house			

Adapted from Braus, J. (Ed.) (1985). Ranger rick's naturescope: Incredible insects. Washington, DC: National Wildlife Federation.

Seeing Beauty in Small Things

Literary Inspiration

Title: Hey, Little Ant

Author: Philip M. Hoose, Hannah Hoose

A dialogue between a young boy and an ant trembling in the shadow of the boy's sneaker. This story brings up questions about ethics and peer pressure, encouraging even the youngest to decide for him- or herself: to squish or not to squish.

Age Groups

primary (grades K-2) and intermediate (grades 3-5)

Materials

- hand lenses and/or dental mirrors
- scraps of paper
- pencils or crayons

Learner Outcomes and Skills

listening skills, creative thinking, observation skills

Overview

When we venture into the out-of-doors, we are aware of many powerful elements of nature: the sky filled with clouds, huge trees, majestic mountains, fragrant flowers. Would these same elements be noticed by something as small as an ant? Probably not. The natural elements in an insect's world might be a pebble that is seen as one of our mountains, or a puddle that is seen as one of our lakes. This activity will help children view the world around them from an insect's perspective.

Activity

Part 1: An Imaginary Adventure

To help children imagine themselves as small as an ant, have them sit quietly in a circle, close their eyes, and listen to this adventure:

"The world is full of billions of creatures that are so small that we do not take the time to notice them. Many of these creatures are under your feet this very minute! Imagine that one sunny afternoon you are lying in the grass watching the clouds float by. You pull on a particularly tall stalk of grass to chew on, but it won't give. You pull and tug, but the blade of grass seems to be anchored to the ground. Out of frustration, you get up to give it a yank with all your might! You squat down and as you take hold of the grass, you feel a

tingle run up your arm and through your body. All of a sudden, the tree overhead becomes larger and larger. Its branches seem to be flying away from you at a rapid pace, until all of a sudden you find yourself the size of a tiny ant, dangling from a blade of grass. The yard you knew so very well looks completely different from a bug's point-of-view. Nearby, you notice what appears to be a trail. Eventually, you set off to discover where it leads."

Part 2: Mapping an Insect Nature Trail

Give each child a dental mirror and/or a small hand lens to help them view things from an insect's point-of-view. Have each child choose a small area of the yard and pretend that he/she is still as small as an ant. In this area, the children will complete the story above by mapping out the trail they find. Using small scraps of paper, ask the children to make signs for the scenic landmarks along their trail. They can make up names such as Tree Root Mountain or Muddy Lake. Encourage them not to rearrange the objects in their area. When everyone is finished, have the children visit each other's trails.

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

Your Yard is Somebody's Home

Literary Inspiration

Title: Hey, Little Ant

Author: Philip M. Hoose, Hannah Hoose

A dialogue between a young boy and an ant trembling in the shadow of the boy's sneaker. This story brings up questions about ethics and peer pressure, encouraging even the youngest to decide for him- or herself: to squish or not to squish.

Age Groups

primary (grades K-2)

Materials

- drawing paper
- ant farm
- pencils or crayons

Learner Outcomes and Skills

process of scientific study, map making, deductive reasoning, the basic needs of ants, comparing ant and human habitats

Overview

As humans, our habitat is filled with many inventions such as electric lighting, refrigerators and running water. These inventions influence the ability of our habitats to meet our needs. Animal habitats vary according to the needs of each animal. This activity will allow children to observe an ant's habitat to determine its sources of food, water, and shelter.

Activity

Part 1: Observing An Ant's Comings and Goings

Have the children observe ants in their natural habitat and/or in an ant farm. After they have determined where the kitchen or source of food is, where the sink or source of water is, and where the shelter or nest is located, have each child or small group of children draw a map of the ant's habitat.

Part 2: What if . . . ?

Ask the children what would happen to the ants if their shelter were run over by the tire of a bike. Or, what if the grass in their habitat were sprayed with chemicals or died from lack of rain? How would these conditions change the ants' home? To survive what changes would they have to make?

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

Web of Life

Literary Inspiration

Title: Hey, Little Ant

Author: Philip M. Hoose, Hannah Hoose

A dialogue between a young boy and an ant trembling in the shadow of the boy's sneaker. This story brings up questions about ethics and peer pressure, encouraging even the youngest to decide for him- or herself: to squish or not to squish.

Age Groups

primary (grades K-2) and intermediate (grades 3-5)

Materials

- large ball of yarn or string
- Web of Life Interactive Story

Learner Outcomes and Skills

drawing connections, explaining cause and effect relationships, group cooperation, listening, observing

Overview

The Earth is composed of both natural and human-built environments. All of these environments are made up of a web of relationships between people, resources, and other living things. In this activity, children will see what can happen to the whole web when one part is altered. They will see connections and explain the cause-and-effect relationship between the actions of people and animals, and the balance of a specific environment.

Activity

Each child will assume the role of one member of a backyard community: **SUN, TREES, WATER, AIR, BIRD, WORM, SOIL, ANT, FLOWER, BEE, PLANT, MOUSE, CAT, PEOPLE.** There may need to be multiple numbers of birds, etc. if the group is large. Pictures or labels can be used to identify characters in the story and web.

The children will form a circle in random order with the same multiple characters (if any) sitting together. The instructor will stand, holding a ball of yarn or string, and narrate the story. The ball will be passed to each child or group of children when the appropriate character is introduced in the story. The yarn will be passed to each character only once when the character is first mentioned. The children will remain seated throughout the story. The yarn will be grasped firmly and held close to the floor so the yarn may be passed easily from one character to another. When the web is completed, the circle of children will stand up, lifting their piece of yarn so the whole group can see the web at work.

Discussion Questions:

1. Look how the web has grown and how many of the strings overlap. Think out the importance of the relationships within the backyard. For example, what effect did the people walking through the yard have on the web? If plants are taken from the yard, which other creatures will be affected? (Have the child/children who represent the plants give a gentle tug on the yarn.) Who feels this pull? (The mouse and bee do.)

2. If plants become scarce, where will the mouse get its food? (It will have to leave the backyard to find food. Instruct the child/children who represent the mouse to give the next pull.) Who feels this pull? (The cat does.)

3. What would happen if a tree fell or was cut down in the backyard? Who will feel the pull? Is the tree anyone's home? (The tree pulls. The worm and bird feel the pull.) Why is the worm important to the backyard? (The worm eats the leaves that fall from the tree and make healthy soil.) Who needs healthy soil? (Plants, flowers, trees, the mouse, and the cat do.)

The Web of Life – Interactive Story

Our backyard community grows healthy and strong with the light of the **SUN.** All of the creatures in the backyard depend on this energy. It keeps them all warm and helps the plants to grow. The tall, beautiful **TREES** that stretch from the ground to the sky look to the sun to give them strength. Rain has just stopped falling in the backyard and has given every thirsty thing a big drink of **WATER**. The **AIR** is cool from the afternoon rain. This air is what the living creatures in the backyard breathe. Take a deep breath. We all need the sun, water, and air.

The backyard is full of life. A colorful **BIRD** sings from the branches of one of the trees and looks around on the ground below for food. It spots a **WORM**, moving around on the ground, that will make a perfect lunch. The worm crawls down into the dirt and eats the leaves that have fallen from the trees. Thanks to this working worm, the **SOIL** of the yard is clean and good for plants to grow in. An **ANT** has made its home in the soil and also in the bark of the tree.

A **FLOWER** has sprouted from its seed in the ground and waves its petals in the wind. Its roots find food in the soil. This flower has been waiting for the busy **BEE** to buzz by and leave the pollen that helps it make seeds for next year's flowers. The roots of this flower and the other plants in the backyard dig deep into the soil of the earth. One **PLANT** is getting warm from the rays of sunlight coming through the leaves of the trees. The raindrops have dried on its leaves. This healthy plant is food for the **MOUSE** who scampers by, ready to take a bite of its fruit. A **CAT** watches the little mouse from behind the tree, keeping its eye on its food for the day.

Suddenly, the cat hears a loud noise and runs off to hide behind a rock wall. Two **PEOPLE** are walking into the backyard. They are picking flowers as they walk. They are happy to be in the yard where the air is cool and the animals play. From way up high in the branches of the tree, the bird sings its welcome song. The people stop for a moment to enjoy this special place. Then they walk on. (Ask the circle of children to stand up, being careful not to let go of or pull the yarn.)

Adapted from Teacher's Population Education Training. (2001). Sharing a small world: Environmental activities for young learners. Washington, DC: Population Connection.

Similarities

Literary Inspiration

Title: Hey, Little Ant

Author: Philip M. Hoose, Hannah Hoose

A dialogue between a young boy and an ant trembling in the shadow of the boy's sneaker. This story brings up questions about ethics and peer pressure, encouraging even the youngest to decide for him- or herself: to squish or not to squish.

Age Group

primary (grades K-2)

Materials

- butcher paper
- markers
- string, yarn, or Sticky Wicky

Learner Outcomes and Skills

identifying and comparing the body parts of humans and ants

Overview

The idea that human beings are animals, made up of the same stuff as our pets and other critters in the wild, may be surprising to some children because we have set ourselves apart from the natural world by living in houses, buying food, and purchasing our clothes. It is difficult to see that people and members of the wild kingdom have some of the same characteristics and needs. This activity will help to show children some of the basic characteristics shared by an ant and a child.

Activity

Place a large sheet of butcher paper on the floor and ask one child to lie down on the middle of it. Trace around his or her body to form an outline on the paper. On another sheet of paper, draw a large image of an ant. Cut out both forms and display next to each other.

Using string, yarn, or Sticky Wicky, connect similar body parts such as head abdomen, feelers, eyes, legs, heart, and mouth. Talk about the similarities and differences between an ant and a child.

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

Simple Things

Literary Inspiration

Title: Hey, Little Ant

Author: Philip M. Hoose, Hannah Hoose

A dialogue between a young boy and an ant trembling in the shadow of the boy's sneaker. This story brings up questions about ethics and peer pressure, encouraging even the youngest to decide for him- or herself: to squish or not to squish.

Age Groups

primary (grades K-2)

Materials

- clear plastic cups
- index cards
- flip chart
- markers

Learner Outcomes and Skills

create a bug catcher to move insects to different locations, creative expression through art

Overview

Without thinking, it is easy to reach for a swatter or extend a foot and destroy a spider, a fly, or an ant. Without thinking, it is easy to label critters as mean, ugly, or nasty. These undeserved bad names encourage misinformation and ill treatment. These activities will help children become more sensitive to the rights of all creatures – both large and small.

Activity

Part 1: A Simple Bug Catcher

Help children see how easy it is to move bugs and spiders to safer, more appropriate locations by using something as simple as a card and a glass or a plastic cup. Demonstrate by placing a cup over an insect then sliding an index card underneath the cup while nudging the insect gently into the temporary trap. After the demonstration, provide each child with a plastic cup and an index card to decorate as a family bug catcher.

Part 2: More appropriate Words

Select five animals or insects that have a reputation for being "nasty". List them on a chart. Next to the animal's or insect's name, record one negative adjective. Have the children think of a least three more appropriate words to more accurately describe the creature. Why are the new words better choices? How might these different words benefit the animals or insects?

APPENDIX B

NURTURING THE SEEDS OF ENVIRONMENTAL AWARENESS

Build A Tree

Age Group

intermediate (grades 3-5)

Materials

none

Learner Outcomes and Skills

understanding of tree biology, cooperation, group cohesiveness

Literary Inspiration

Title: Once There Was A Tree

Author: Natalia Romanova

Originally published in the Soviet Union, this book of beauty and simplicity speaks to the reader about time and nature. It is the tale of a tree split by lightening, then felled by a woodsman so that only the stump remains. Many critters try to claim the stump as their own, but the stump is part of the Earth, and the Earth belongs to us all.

Overview

This activity has a magical power to draw individuals together in the spirit of cooperation as they learn about the biology of a tree. In this activity, players act out the various parts of a tree: the taproot, lateral roots, heartwood, sapwood, phloem/cambium, and bark. In large groups, more than one player can take each role.

Activity

Each part of the tree will convey the role it plays in the health and survival of the tree as a whole through pantomiming appropriate actions.

Heartwood: Two or three tall, strong-looking children will be needed to play the heartwood. Have them stand with their backs to each other. Explain to the other participants that the heartwood is the inner core, the strength of the tree. The heartwood's job is to hold the trunk and branches upright so the leaves can receive sunlight. The heartwood is dead – but well preserved. It used to carry water and food, but the tubes are now clogged with resin and pitch. The job of the heartwood players is to stand tall.

Taproot: Several children will be needed to play the taproot. These children will sit at the base of the heartwood facing outward. Explain that this root is very long and goes into the

ground about thirty feet. The taproot enables the tree to get water from deep in the earth, and it also anchors the tree firmly to the ground! It is this root that keeps the tree from blowing over in strong winds. Not all trees have taproots (Redwoods do not), but this one does.

Lateral Roots: Choose children with longer hair who won't mind lying on the ground for this part of the tree. These lateral roots will lie on their backs with their feet against the trunk and their bodies extending away from the tree. Explain that there are hundreds and hundreds of lateral roots that grow outward all around the tree. Lateral roots look like branches only they grow underground. They, too, help hold the tree upright. At the tip of the roots are tiny root hairs. When root hairs sense water nearby, the cells grow toward it and suck the water up. The tips of the root hairs are as tough as football helmets. Encourage both the taproot and the lateral root players to practice slurping up water. Each time the leader says, "Let's slurp!" the root players will make a slurping noise.

Sapwood: Select enough children to form a complete circle around the heartwood. These children will play the part of the sapwood. They will face inward holding hands and taking care not to step on the roots. The purpose of the sapwood is to draw water up from the roots into the branches. The sapwood acts as a very powerful pump with no moving parts. It lifts hundreds of gallons of water a day at speeds of over one hundred miles an hour. After the roots slurp the water from the ground, the sapwood moves the water up the tree by lifting connected arms up and shouting "Wheee!" The command for this will be, "Bring the water up!"

Cambium, Phloem and Leaves: Another group of children will act out the part of the cambium/phloem layer by forming a circle surrounding the sapwood and facing inward. They will hold hands with their arms down at their sides. The cambium layer is the growing part of the tree. Each year it adds a new layer to the sapwood and phloem. The phloem is the part of the tree that carries food manufactured by the leaves down and distributes it to the rest of the tree. These children will also act the part of the leaves and will stretch their arms upward and outward intersecting their neighbors' arms and leaving their hands free to flutter like leaves. Whenever the command, "Let's make food" is given, these players' arms will raise and flutter to absorb energy from the sun and make

food. When the leader says, "Bring the food down," the cambium/phloem group will make a big "Whooo" sound while bending the knees and dropping their arms and bodies toward the ground. Practice all parts given so far. Give commands in this order to reflect what happens in a tree: "Let's Slurp! Let's make food! Bring the water up! Bring the food down!"

Bark: All the remaining children will become the bark of the tree by gathering around the tree and facing outward. They will protect the tree by crossing their arms over their chests with fists close to the chest and elbows pointing out. If a nasty insect comes along to attack the tree, the bark players will need to fend it off. Fire, extreme temperature, children with pocket knives, and insects can all be threats to the tree.

Finally, lead the entire tree through the complete sequence of its actions. Go through the sequence three or four times. The commands for the tree parts are as follows:

1. "Heartwood, stand tall and strong!"
2. "Get tough, Bark!"
3. "Roots, let's slurp!"
4. "Leaves, let's make food!"
5. "Sapwood, bring the water up!"
6. "Phloem, bring the food down!"

After the first round, make the activity more challenging by shouting out the commands without giving the names of the tree parts.

Adapted from Cornell, J. (1989). Sharing the joy of nature. Nevada City, CA: Dawn Publications.

Heartbeat of a Tree

Age Group

primary (grades K-2), intermediate (grades 3-5), and advanced (grades 6-7)

Materials

- stethoscope

Learner Outcomes and Skills

empathy, tree physiology

Literary Inspiration

Title: Once There Was A Tree

Author: Natalia Romanova

Originally published in the Soviet Union, this book of beauty and simplicity speaks to the reader about time and nature. It is the tale of a tree split by lightening, then felled by a woodsman so that only the stump remains. Many critters try to claim the stump as their own, but the stump is part of the Earth, and the Earth belongs to us all.

Overview

A tree is a living creature. It eats, rests, breathes, and circulates "blood" much as we do. The heartbeat of a tree is a wonderful crackling, gurgling flow of life. The best time to hear the heartbeat of a tree is in the early spring when the trees send first surges of sap upward to the branches in preparation of another season of growth.

Activity

Choose a tree that is at least six inches in diameter and has thin bark. Deciduous trees are generally better for listening to than conifers, and certain individuals of a species may have a louder heartbeat than others. Press a stethoscope firmly against the tree, keeping it as still as possible to eliminate extra noises. You may have to try several places on the tree trunk before finding a good listening spot.

Children will want to hear their own heartbeats. Listen also to the heartbeats of mammals and birds. The variety in sounds and rhythms is fascinating.

Adapted from Cornell, J. (1979). Sharing nature with children. Nevada City, CA: Dawn Publications.

Evaporation Tricks

Literary Inspiration

Title: Storm on the Desert
Author: Carolyn Lesser

A fierce summer storm dramatically affects the desert plants and animals of the American Southwest.

Overview

The process of evaporation is happening all the time. Water is constantly "disappearing" from surfaces such as plants, animals, soils, and bodies of water. In this activity children will have the opportunity to find out how evaporation affects living things in the desert and how evaporation helps shape the way many desert landscapes look.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- several buckets of water
- sponge
- many small pieces of cut-up sponge
- ruler
- 3 shallow pans
- salt
- stopwatch
- chalkboard

Learner Outcomes and Skills

define evaporation, explain how evaporation affects plants, animals, and landscapes in the desert

Activity

Part 1: Water Away

Demonstrate how water evaporates by wiping a wet sponge across a chalkboard. After waiting for a few seconds for dry spots to appear, ask the children where the water went. Explain that the water evaporated, or changed from a liquid to an invisible gas called water vapor. Discuss other examples of things that water evaporates from such as wet clothes on a clothesline, sweat on the forehead, and wet sidewalks.

Next ask how heat might affect evaporation. Does it speed up how fast the water disappears? Does it slow it down? Do nothing? Try the two demonstrations listed below on a sunny day to answer these questions and to help illustrate evaporation.

- Place a shallow pan in a sunny, open area and an identical pan in a shady area early in the day. Fill the pans with exactly 2" of water. Leave the pans in place all day and then measure the amount of water in each pan. Note whether one pan has more water and determine if that pan was in the warmer, sunny location or the cooler, shady location.

- Show how quickly rainfall evaporates off the hot desert ground with this sidewalk graffiti demonstration. Gather a bucket of water, pieces of sponge, and a stopwatch before heading outside. Search for a sunny section of sidewalk (or blacktop) and a shady section. Using the sunny section of sidewalk first, have the children use the water and sponges to write their initials on this surface. Time how long it takes for the water to evaporate completely. Then repeat this process on the shady section of sidewalk. In which area did the water evaporate more quickly? Why?

Park 2: Salt Flats

To show what happens when salty water evaporates, do this quick and simple demonstration. Dissolve some salt in a shallow pan of water and place it near a heater or in the sun for 2-3 days. What is left behind as the water disappears?

Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

Desert Landforms Come to Life

Literary Inspiration

Title: Storm on the Desert

Author: Carolyn Lesser

A fierce summer storm dramatically affects the desert plants and animals of the American Southwest.

Age Group

intermediate (grades 3-5) and advanced (grades 6-7)

Materials

- copies of Desert Landforms Handout
- copies of Landform Clues
- large sheet of paper
- scissors
- 3 shallow pans
- color pictures of desert landforms
- glue
- crayons or colored chalk

Learner Outcomes and Skills

describe desert landforms and explain how they form

Overview

Landforms are a riveting part of desert landscapes. From deep rock canyons to arches and sand dunes and from arroyos and playas to salt flats and buttes, the desert catches our attention and makes us wonder how these physical features were formed. Some might have been carved by fast-moving water and blowing sand. Others form as temporary streams and lakes evaporate leaving behind minerals, salts, and dried mud. In this activity the children can learn about some common desert landforms by matching pictures to clues and by playing "landform charades."

Activity

Part 1: Match the Clues

First pass out copies of the Desert Landforms Handouts and Landform Clues to each child or pair of children. Each child or pair will also need a sheet of easel or other large paper. Direct the children to cut out all landform and clue cards from the handouts. Using dictionaries and desert reference books, have the children match the pictures and clues before gluing them around the edge of the large piece of paper. Be sure that each clue card is glued next to its landform card.

View colored landform photographs or poster once everyone has completed the first part of the activity. Explain that many desert landforms are brightly colored with shades of red, yellow, orange, purple, brown, and white due to the many different minerals in the rocks. The colors are very noticeable in the desert because vegetation is limited.

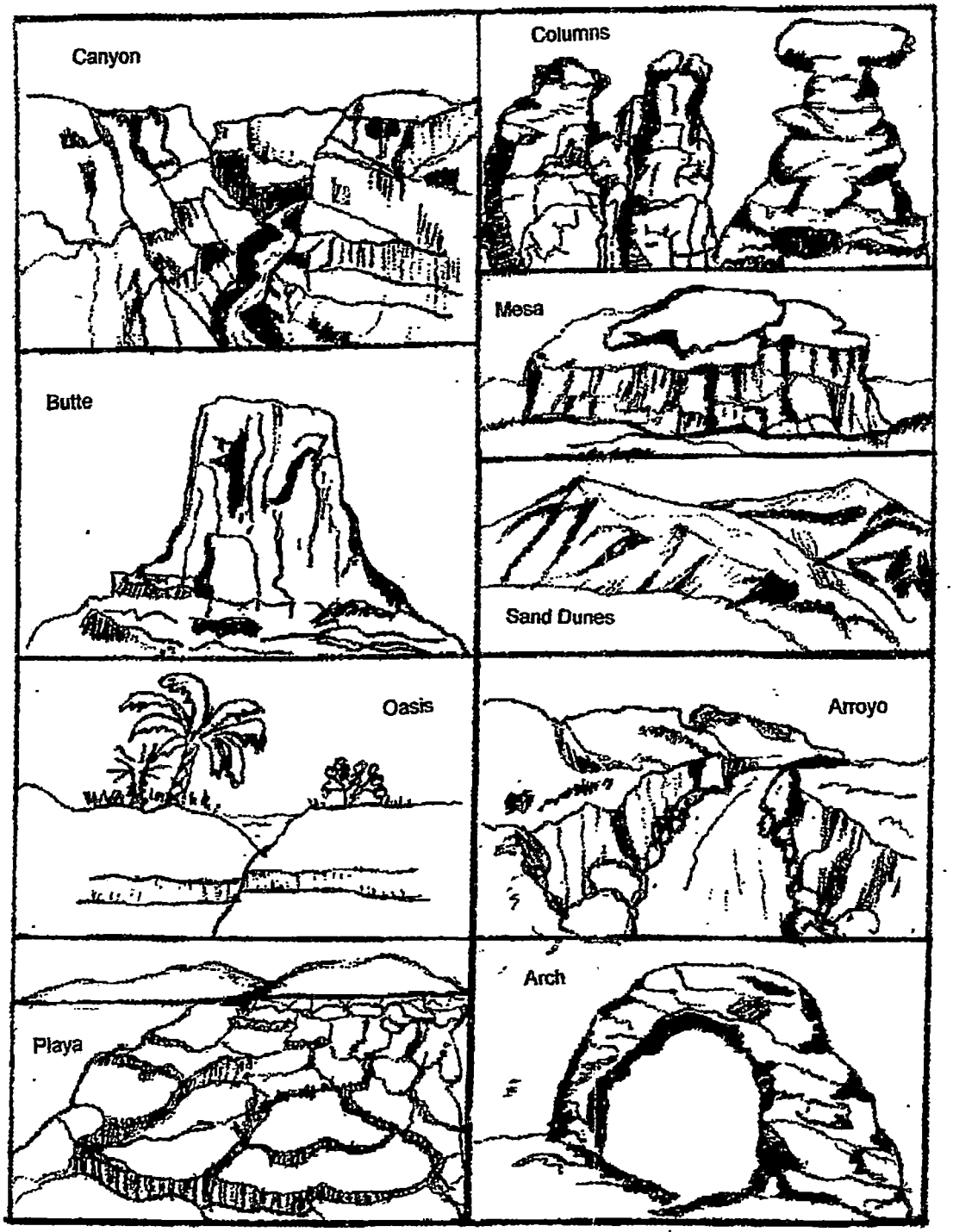
Have the children color in landform pictures using crayons or colored chalk. In the center of the large sheet of paper have the child or pair write a poem or paragraph about desert landforms. The poem could be a rhyming poem, a haiku, a cinquain, or a free verse poem. The paragraph might include an explanation about the formation of specific landforms.

Part 2: Landform Charades

Divide the group into three or four teams. Each team is directed to act out a desert scene utilizing at least two of the landforms discussed previously. Explain that each child needs to participate in the charade and can act out landforms, water, plants, or animals. Other teams can guess which landforms are being acted out, or each team can have a narrator to describe the charade and its components.

Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

Desert Landforms Come to Life Handout



Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

Desert Landforms Come to Life Handout

Landform Clues

1. Formed by: · constant supply of water, usually from underground springs **Features:** · areas of green vegetation surrounded by arid land	**6. Formed by:** · wind and water eroding softer rock under a cap of hard rock **Features:** · steep, sloping sides · flat top
2. Formed by: · water from rainstorms flowing as streams into a low-lying, undrained basin **Features:** · temporary shallow lake · dry, cracked, slat encrusted flat surface	**7. Formed by:** · wind and water eroding softer rock under a cap of hard rock **Features:** · isolated hill or mountain with steep sides · flat or rounded tops · smaller version of landform #6
3. Formed by: · wind **Features:** · a hill or ridge of sand · variable shapes and sizes	**8. Formed by:** · swiftly flowing water eroding rock bases **Features:** · tall rock formations – some with harder caprocks · also called needles, pedestals, pinnacles
4. Formed by: · flowing river or stream **Features:** · deep, narrow valley with water often flowing at the bottom · steep sides cut through rock	**9. Formed by:** · flowing streams or creeks **Features:** · dry gully with a flat bottom · steep sides · Spanish name
5. Formed by: · flowing water moving through a small hole or crack in soft rock **Features:** · window-like opening · bridge formed from rock	

Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

Ice Plant and Elephant Trees

Literary Inspiration

Title: Storm on the Desert
Author: Carolyn Lesser

A fierce summer storm dramatically affects the desert plants and animals of the American Southwest.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- drawing paper
- crayons, markers, paints, colored pencils or chalk
- large sheets of paper
- desert research books (optional)

Learner Outcomes and Skills

name two desert plants and state one interesting fact about each

Overview

What do pincushions, sand dollars, and beavertails have in common? They're all names of cactuses! These cactuses along with a lot of other desert plants have names that describe what they look like. In this activity children put their imaginations to work as they learn about some desert plants and their unusual names.

Activity

Make a list of the following desert plant names on a chalkboard or large piece of easel paper:

old man cactus
strawberry cactus
barrel cactus
feather cactus
pincushion
elephant tree
teddy bear cholla (CHO-ya)
living stones
ice plant

Explain that these desert plant names describe the way these plants look. Pass out drawing paper and coloring supplies, and encourage the children to use their imaginations to draw what one or more of the plant listed might look like. When the drawings are completed, have the children use guide and reference books to find pictures of the plants so they can see what these uniquely named plants really look like.

Here are the names of some other neat desert plants that the children can draw and/or research:

candle plant	fishhook barrel cactus
ghost flower	rabbit brush
panda plant	rainbow cactus
yellow bee plant	smoke tree

Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

The Desert Scramble

Literary Inspiration

Title: Storm on the Desert

Author: Carolyn Lesser

A fierce summer storm dramatically affects the desert plants and animals of the American Southwest.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- construction paper
- markers
- straight pins
- pictures of a coyote, bobcat, ringtail, and jackrabbit

Learner Outcomes and Skills

explain what competition is, discuss limited resources and how they can effect desert communities

Overview

Water is a precious resource in any environment, but there is no place where it is more precious than in a desert. In most desert areas, finding a drink is tough because water is so scarce. In this activity, children can find out what it might be like to compete for limited water in the desert while trying to avoid being eaten by a predator.

Activity

Part 1: Inside

Begin the activity with a discussion about competition. Ask for an explanation of competition and a few examples. Explain that people aren't the only ones who compete for things. Animals compete, also, but it's not quite the same as competition between people. Animals (and people) compete with each other for food, shelter, water, and living space – the four things all animals need to survive. Animals, however, never think about trying to "beat out" other animals for something. They are driven to compete by an instinct to stay alive and reproduce.

Explain that in many desert communities resources may be limited. For example, there may be a limited supply of water or food or nesting sites. How would these limitations affect the animals that live in the desert community? What might change? The outside activity that follows will allow the children to experience limited resources and competition in an active, role-playing manner. The children will find out first-hand what happens to the number of animals in a desert community when resources are limited.

Part 2: Outside

Assign each child a part to play in the Desert Scramble. Have each child make a label of that part to be placed on their back, and that is large enough to be easily read by the other players. Six children will be jackrabbits; six will be ringtails; four will be water holes; three will be coyotes; two will be bobcats; and one will be the sun. (Adjust the numbers to fit the size of the group).

Talk about each part. Ringtails and jackrabbits are two animals that live in the desert and need to drink water. Coyotes are predators that often eat jackrabbits and other small mammals, birds, and reptiles. (They are also know to eat insects, carrion, and fruit.) Bobcats are also predators that eat ringtails, jackrabbits, other small mammals, birds and reptiles. (Show picture of animals if available.) The children who are water holes represent water for the desert animals, and the child who is the sun represents the hot, dry conditions in the desert that cause water to evaporate quickly.

Mark the activity's boundaries, making sure that it is large enough for the players to run around easily. To play the Desert Scramble have the children spread out forming a huge circle with lots of space between each other.

The object of the game for each child depends upon the part being played. When the Scramble begins, the object for the jackrabbits and ringtails is to tag a water hole before getting tagged by a coyote or a bobcat. The object for a coyote is to tag a jackrabbit. The object for a bobcat is to tag a jackrabbit or ringtail. (Coyotes and bobcats also need water, but in this activity, they cannot tag a water hole.) The object for the sun is to tag a water hole before they are tagged by jackrabbits or ringtails. The object for the water holes is to avoid being tagged.

Once someone is tagged, both the tagger and the person tagged must go and sit out the remainder of the round. After everyone who can be tagged has been tagged, count the number of ringtails and jackrabbits who were able to find a water hole. Help the children to understand that in this activity water was the limiting resource or limiting factor, that determined the number of ringtails and jackrabbits the area could support. Play the game several times and let the children switch roles.

Adapted from Braus, J. (Ed.) (1988). Ranger rick's naturescope: Discovering deserts. Washington, DC: National Wildlife Federation.

Amazing Mangroves

Literary Inspiration

Title: Everglades

Author: Jean Craighead George

The Florida Everglades is a unique ecosystem. A storyteller teaches five children how the Everglades formed, what plants and animals thrive there, and how human encroachment is threatening to destroy this magical "river of grass."

Age Group

primary (grades K-2)

Materials

- markers or crayons
- Amazing Mangroves Handout

Learner Outcomes and Skills

identify some animals that live in a mangrove swamp, explain ways animals use mangrove swamps

Overview

The water is up to your ankles and a terrible smell reaches your nose. You move along slowly, watching a great blue heron fish for its lunch. A dragonfly zips past your head as you watch a flock of ducks take off from the water and fly up over the trees. You could be in any number of different types of wetlands. One type of wetland is a mangrove swamp. In this community the dominant plant life is mangrove trees. A mangrove swamp provides homes for many different kinds of animals. In this activity children will be introduced to the mangrove swamp community.

Activity

Part 1: Who's Who in the Mangrove Swamp

Pass out copies of the Amazing Mangroves Handout. Have the children look at the scene and then discuss some of the plants and animals that live in the mangrove swamp community. You can talk about the two red mangrove trees illustrated, or about each of the animals that live on or around the trees using the background information found at the end of this activity section. Some sample questions to ask may include:

1. How many birds are in the picture? What are they doing?
2. Where is the snail in the picture? What do you think snails eat?
3. Why do you think the smaller fish are clustered around the roots of the tree?

Wrap up this part of the activity by passing out markers and crayons and having the children color their mangrove swamp scene.

Background Information: Who's Who in the Mangrove Swamp

White Ibis

nests in mangrove trees; builds platform nests made of twigs; nests in colonies; feeds on crabs and other small animals it picks out of mud at low tide

Brown Pelican

makes sturdy nest of sticks, reeds, and twigs woven into the upper brances of mangrove trees; usually nests in large colonies; makes flying dives into the water to scoop up fish; endangered in parts of the United States, but is now making a comeback

Mangrove Snapper

swims among submerged mangrove roots; feeds on shrimp, small crabs, and other crustaceans; young stay among roots to hide from predators

Blue Crab

has paddle-like fifth pair of legs that help it swim; clings to roots when in soft shell stage after molting; eats plant material, shrimp, small fish, oysters, clams, and animals that have recently died

American Crocodile

waits among submerged mangrove roots for fish, mammals, and birds – quickly snaps up prey; female builds nest of sticks and leaves; is endangered with only a few hundred remaining in the United States

Yellow Rat Snake

climbs among the trees; is not poisonous; eats rodents, birds, and eggs

Sea Horse

a type of fish; uses its tail to cling to mangrove roots; the father carries young in a brood pouch until they hatch; eats plankton that it sucks in through tube-like mouth

Oyster

feeds on organic material by sucking in water through siphon and filtering out food; attaches to prop roots with fingerlike extensions along shell; grows in large clusters

Green-Backed Herron

builds platform nest of sticks in mangrove roots, only inches above high water mark; hunts for fish, frogs, insects, and small snakes in shallow water

Mangrove Tree Crab

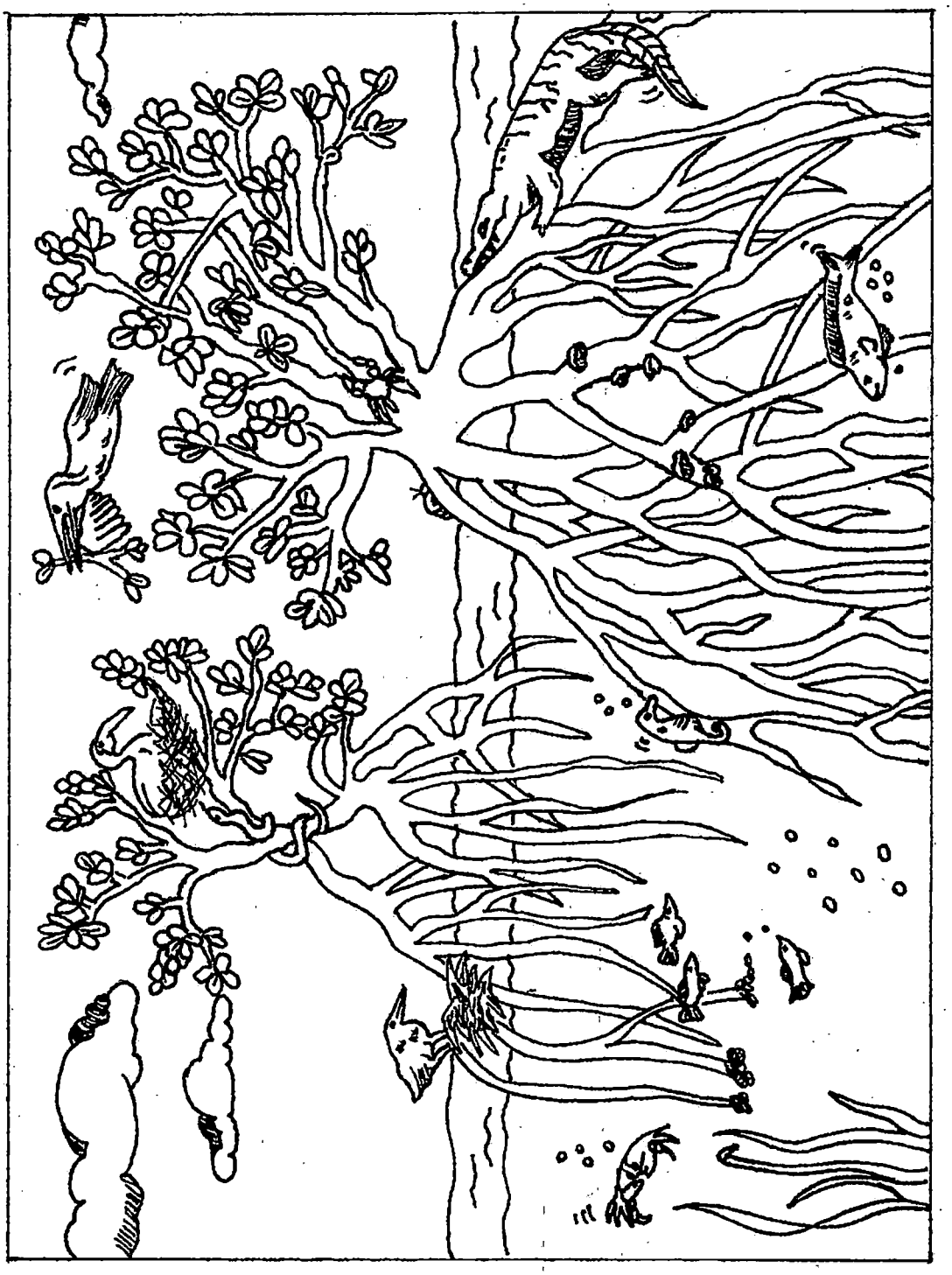
feeds on mangrove leaves; lives in upper branches of mangrove trees; if alarmed, drops from branches into the water

Angulate Periwinkle

one of the most abundant types of snails found in mangrove swamps; feeds on algae and other plant material; is found on roots and branches above high water mark

Adapted from Braus, J. (Ed.) (1989). Ranger rick's naturescope: Wading into wetlands. Washington, DC: National Wildlife Federation.

Amazing Mangroves Handout



Adapted from Braus, J. (Ed.) (1989). Ranger rick's naturescope: Wading into wetlands. Washington, DC: National Wildlife Federation.

Wetland Slogans

Literary Inspiration

Title: Everglades

Author: Jean Craighead George

The Florida Everglades is a unique ecosystem. A storyteller teaches five children how the Everglades formed, what plants and animals thrive there, and how human encroachment is threatening to destroy this magical "river of grass."

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- crayons, markers, or paints
- scissors
- glue
- construction paper
- reference and guide books

Learner Outcomes and Skills

understand the characteristics of a wetland, describe several animals that depend on wetland

Overview

Hundreds of plant and animal species depend on wetlands for food, water, shelter, and as a place to raise their young. This activity helps children realize marshes are very special places, and it encourages them to let others know that wetlands are valuable wildlife habitats.

Activity

Before starting the activity, write the following questions on a large piece of paper:

1. Can you list several reasons why wetlands are important?
2. Can you name several animals that depend on wetlands?
3. Can you name two famous wetlands in North America?

Have the children answer each question as best they can. Use this opportunity to talk about the characteristics of a wetland, as well as, the plants and animals that depend on wetlands, including endangered, threatened, and rare species. Now have the children teach others about the importance of wetlands by having them design a stamp, poster, t-shirt, or bumper sticker. Their creations should include a catchy slogan and a design or picture that symbolizes a way that wetlands are important to wildlife. Give the children time to research the plants and animals they will be including in their design. Afterward, display the finished designs so that others can learn more about the magic and importance of wetlands.

Adapted from Braus, J. (Ed.) (1989). Ranger rick's naturescope: Wading into wetlands. Washington, DC: National Wildlife Federation.

The Great Swamp Debate

Literary Inspiration

Title: Everglades

Author: Jean Craighead George

The Florida Everglades is a unique ecosystem. A storyteller teaches five children how the Everglades formed, what plants and animals thrive there, and how human encroachment is threatening to destroy this magical "river of grass."

Age Group

intermediate (grades 3-5) and advanced (grades 6-7)

Materials

- Great Swamp Debate Handout

Learner Outcomes and Skills

read, analyze, and debate the various perspectives surrounding a wetland issue

Overview

Solving environmental problems is never an easy job. You must consider all of the facts, as well as how people, wildlife, and other natural resources will be affected. In this activity children will have a chance to see that a wetland issue, just like any environmental issue, can be very complex and controversial.

Activity

Begin by dividing the children into two groups. One group will represent the pro-airport prospective and the other group will represent the anti-airport prospective. Provide all members of the groups with a copy of the newspaper article that represents their prospective. Explain that the two newspaper articles, although not authentic, represent a real environmental controversy that began in 1959 in New York and New Jersey.

Give the children time to read their article and prepare talking points for the debate. Some talking points to bring to their attention may include: advantages/disadvantages of building the airport, advantages/disadvantages of leaving the wetland in its natural state, compromises or alternatives to the issues.

Allow each group a set amount of time to present their side of the issue. If time permits, allow the groups to continue with the debate process (rebuttal, questions). For this activity there does not need to be a winning team. The objective is for children to understand the complexity and the implications of an environmental issue.

To conclude this activity, briefly discuss the complexity of solving environmental problems. When making decisions about some aspect of the natural world we must consider how these decisions will affect people, wildlife, and other natural resources.

Adapted from Braus, J. (Ed.) (1989). Ranger rick's naturescope: Wading into wetlands. Washington, DC: National Wildlife Federation.

The Great Swamp Debate Handout

NEW AIRPORT NEEDED IN JERSEY

New York – The Port Authority, a transportation agency in New York and New Jersey, held a meeting here yesterday. The purpose of the meeting was to discuss plans for a new major airport to be built in the New York – New Jersey area. Ed Warren, a speaker for the Port Authority, explained that the airport will satisfy the growing need for more air travel services in the region.

The airport would need a large, level site, and one that's fairly close to New York City. "We've studied fifteen possible sites," said Warren, "and we think we've found the perfect location." Warren reported that the preferred site is in Morris County, New Jersey. It's nothing but a big swamp right now, but it will be very useful to a lot of people once the airport gets underway."

Port Authority figures show that the other major airports in the area will soon have more business than they can handle. In the next five years, business is expected to double. And in fifteen years, it could increase by as much as three to four times its current level.

Discount store owner John Landis commented on the favorable effects the airport would have on stores, restaurants, and hotels located near it. "Our business will increase – no doubt about it," he said. "And that means more economic growth for Morris County."

Labor leader Tom Hines agreed. "Thousands of new jobs will open up when building begins," he added. "There will be new opportunities for planners and construction workers. And once the airport opens there will be even more jobs. The airport will need ticket checkers, air traffic controllers, maintenance workers, and many, many, others. Plus, the new airport will attract all kinds of new businesses around it."

Great Swamp In DANGER

Morristown, New Jersey – Scientists, naturalists, and concerned citizens met here yesterday to discuss the plan for a new major airport to be built in the Great Swamp of Morris County. The purpose of the meeting was to discuss what can be done to prevent the building of the airport.

Sam Brown, a long-time resident of Morris County, presented facts from several scientific reports. "The reports indicate that building the airport in the Great Swamp will cause more problems than it will solve," he said. According to the reports, the swamp area would be very difficult and costly to develop. "It's going to cost a lot of money to drain out the swamp water and keep it out," Brown said.

Increased noise and pollution to communities near the swamp were cited as other problems that the airport would cause. Many people also feel that existing roads will not be able to handle the added traffic to and from New York. Tina Shore, another Morris County resident, pointed out that many homes, churches, and schools near the proposed airport site would probably have to be destroyed to make way for the huge airport. "It would affect thousands of people," she said. "And it might affect the water supply in the area."

University biology professor Judy Dayton talked about the history and biology of the Great Swamp. "The swamp is left over from the last Ice Age, when the area was part of a glacial lake. It's home to many plants and animals," Dayton explained. "Building the airport here would destroy their special habitat. And many wouldn't be able to adapt to new surroundings."

"I grew up with the swamp as my playground," said Allen Jones, a local high school student. "The Great Swamp has a lot to teach us all," he added.

Adapted from Braus, J. (Ed.) (1989). Ranger rick's naturescope: Wading into wetlands. Washington, DC: National Wildlife Federation.

APPENDIX C

THE HUMAN CONNECTION: PEOPLE AND NATURE

Earth Circle of Life

Literary Inspiration

Title: EarthDance

Author: Joanne Ryder

A powerful poem that invites readers to become not just a part of the Earth, but Earth itself – standing tall in space, carrying mountains and rivers on its back, housing insects, animals, and people.

Age Groups

primary (grades K-2) and intermediate (grades 3-5)

Materials

- yellow ball or other symbol of the sun
- Earth parts index cards
- paper
- pencils or crayons
- fire ring or container for burning paper in
- matches

Learner Outcomes and Skills

understand what each part of the Earth provides for people and other living things, understand what people can do every day to be good stewards of the Earth

Overview

Ecology and environmental conservation have shown us that while the Earth is beautiful and giving, it is also finite and fragile. This activity teaches children they can thank the Earth for the gifts it gives us, and encourages them to make a commitment to help the environment by doing something positive for the Earth in their own lives.

Activity

Part 1: Gifts from the Earth

Bring all of the children together in a circle. Each small group of children, or individual child, will have a parts of the Earth index card (directions for creating these cards can be found at the end of the activity section). Explain that the circle of children represents the Earth and the different life cycles. Have the "sun" (a child carrying a yellow ball or other sun symbol) enter the circle and tell the children what it provides for all living things. The ball should then remain in the center of the circle.

Have the children representing each part of the Earth come into the circle one at a time. They will tell what part of the Earth they are and what gifts they provide to people and other life on Earth. The cards will be placed in the center of the circle near the sun, and the children will return to the circle.

Part 2: Gifts to the Earth

Have each child sit in place in the circle and write down on a piece of paper one or more things they promise to do to take care of the Earth. Also on the paper, have each child express thanks to the Earth by writing something such as a poem, short letter or story, or by drawing a picture.

One at a time, each child will come into the center of the circle to share their promise and thanks to the Earth. The child will drop their slip of paper into the fire ring and return to the circle. When everyone has done this, burn the index cards and papers containing the gifts both to and from the Earth. Bury the ashes in the ground. The ashes symbolize the children's and Earth's gifts to each other, which completes one circle of life, giving and receiving.

Directions for "parts of the Earth" index cards:

Decorate one side of an index card with a symbol of a part of the Earth. On the other side of the card write a brief statement about what that part of the Earth gives to people and other living things. Below are some statements to include on the cards:

- **sun** – I(we) give light, heat and energy to make the plants grow.
- **plants** – I(we) use the sunlight and make food and oxygen for other living things.
- **soil, rocks** – I(we) feed the plants to make them grow.
- **air** – I(we) give breath of life to the living things.
- **water** – I(we) quench the thirst and bring life to all plants and animals.
- **seasons** – I(we) – spring, summer, fall and winter – bring change each year: heat and cold, wet and dry, sleep and wakefulness, new life and old.
- **animals** – I(we) feed people and each other, help to pollinate flowers and sow plant seeds, and bring movement and sounds to the Earth.
- **stars and moon** – I(we) light the night sky, guide the way and bring the tides.
- **people** – I(we) care for the Earth and hold all of parts of the Earth in our hands.
- **stories** – I(we) bring the world to life in your imagination.
- **circles** – I(we) keep the life on Earth going and keep everything in good balance.
- **life and death** – I(we), life, bring living things where there were none before. I(we), death, make room for new life. I(we), life and death, keep the circle of life and death turning.

Adapted from Caduto, M. J., & Bruchac, J. (1988). Keepers of the earth: Native American stories and environmental activities for children. Golden, CO: Fulcrum Press.

Earth Awareness Walk

Literary Inspiration

Title: EarthDance

Author: Joanne Ryder

A powerful poem that invites readers to become not just a part of the Earth, but Earth itself – standing tall in space, carrying mountains and rivers on its back, housing insects, animals, and people.

Age Groups

primary (grades K-2) and intermediate (grades 3-5)

Materials

- none

Learner Outcomes and Skills

understand that we can do things to live more harmoniously with our planet and its many inhabitants

Overview

The children of today need to be aware that it is from the Earth that we receive many gifts: air to breath, water to drink, food to eat, and the materials to shelter us. In return, we should love and respect our Earth, our home. This activity encourages children to find and do things in their own lives that help keep the Earth healthy and clean.

Activity

Begin this activity by talking the children on a walk around a nearby neighborhood. As you and your children walk, chant the following rhyme: "Who cares about me? The Earth cares about me! Who cares about the Earth? I care about the Earth!" Repeat the chant twice, and then have the children stop and look around and identify something nearby that helps the Earth or something that can be done, altered, or added to protect the Earth. Things to look for might include: clothes hanging on a clothesline, someone tending a garden, trash cans and recycling bins, someone riding a bicycle, litter lying on the ground, water running down a sidewalk, etc. Continue with the walk, having the children repeat the chant and the observational activity frequently.

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

Postcard Power

Literary Inspiration

Title: EarthDance

Author: Joanne Ryder

A powerful poem that invites readers to become not just a part of the Earth, but Earth itself – standing tall in space, carrying mountains and rivers on its back, housing insects, animals, and people.

Age Groups

primary (grades K-2) and intermediate (grades 3-5)

Materials

- postcards depicting plants, animals, and other natural resources or cardstock
- pencils and crayons

Learner Outcomes and Skills

celebrate the wonders of the Earth, creative writing, creative expression through art

Overview

There are many wonders of the Earth, all you have to do is look around. Undoubtedly, you will see something unusual or beautiful that fills you with awe or makes your heart sing. One way to capture and appreciate the excitement and joy generated by the many extraordinary gifts our planet has to offer is to share it with a friend. This activity will encourage children to better appreciate and share the gifts of our planet through written expression.

Activity

Allow each child to choose a postcard, or provide each child with cardstock to create their own postcard. Have the children write a message (to a friend or family member) on the back of the postcard expressing their awe and appreciation of the natural world. Encourage the children to be creative. They can write a poem or create a story around the image on the postcard. If the children are creating their own postcards have them draw a picture of something they find wondrous in nature. Have the children share their postcards with each other.

The Shrinking Habitat Game

Literary Inspiration

Title: Where Once There Was A Wood
Author: Denise Fleming

This book provides a deeply affecting portrait of our disappearing natural environment. The final pages encourage families to become better stewards of the Earth by welcoming wildlife to their own backyards.

Age Group

primary (grades K-2) and
intermediate (grades 3-5)

Materials

- long rope

Learner Outcomes and Skills

following directions, listening skills, food chain, identifying human influences on wilderness areas

Overview

As soon as people encroach on a wilderness area and build houses, shopping malls, or highways, the animals living within that area must compete for fewer and fewer resources. This activity will help illustrate some of the hardships faced by these animals when an area is developed in the name of progress.

Activity

Before beginning the activity have the children focus on a familiar habitat. Name some of the animals, birds, or insects that might call this habitat home. What is the quality of life for these critters in this undisturbed, natural area? Do they have adequate space, water, shelter, and food? What happens when one of these elements disappears?

Prepare for the activity by using a long rope to make a circle that will represent the habitat discussed earlier. Have each child select one of the animals, insects, or birds to portray in this habitat. Invite all of the critters to step into the area representing their habitat.

Begin by calling out a shrinking habitat influence such as a forest fire, building a dam, clear-cutting trees, farming, livestock grazing, mining, new houses, new roads, or new shopping centers. Each time a factor is called out have the children shrink the habitat by tightening the rope.

As the rope tightens and space inside the circle shrinks, the children representing animals will have to adjust themselves to this change. Competition for space will begin, and the animals will start falling or being pushed out of the limited space in the circle. Once the animals are pushed out of their habitat, they can no longer survive.

Follow up at the end of the shrinking habitat with some questions. How did you feel when the circle became so crowded that it was almost impossible to stay in? What is one of the most habitat-threatening influences that wild animals face today? How can humans be more considerate of animal life when expanding into new areas?

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

No More Room

Literary Inspiration

Title: Where Once There Was A Wood
Author: Denise Fleming

This book provides a deeply affecting portrait of our disappearing natural environment. The final pages encourage families to become better stewards of the Earth by welcoming wildlife to their own backyards.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- one scrap of paper for each player
- animal crackers

Learner Outcomes and Skills

following directions, listening skills, food chain, identifying human influences on habitats

Overview

Extinction is a real possibility for hundreds of animal species on our planet today. The disappearance or alteration of habitats throughout the world is the primary cause of this significant problem. Unfortunately, this habitat devastation is a result of choices humans have made through the years. Urbanization, deforestation, and pollution have all impacted ecosystems in ways that makes it difficult to avoid the extinction of entire groups of animals. Humans have a responsibility to prevent this destruction through careful stewardship of our planet and its inhabitants.

Activity

This activity will help children understand that people need to protect natural areas as animal habitats if we are to continue to co-exist on the finite spaces available on planet Earth.

Have the children wait outside the space set aside for this activity. Have each child place one scrap of paper around the space. On each paper scrap place an animal cookie. Explain that each piece of paper represents an island on an undiscovered planet. The planet has one animal living on each island. The children will be visitors coming from outer space to live on the islands. However, due to limited resources, each island can support only one person or three animals.

To begin the activity, have one child land on any island. Have the child determine if there is room for the animal on the island, too. The answer will be no given the limited resources reported above. Direct the child to move the animal to another island and ask if there is room for it on the new island. The answer will be yes unless it already has three animals or one human on it.

Continue in this manner until one of the animals has no place to go. Then the leader of the activity will eat the cracker (animal) that has been displaced. That animal is now extinct and can never come back.

Continue the activity until there is only one paper left with three animals on it and one human waiting to land from outer space. Point out to the children participating that we must decide if we are going to save spaces for animals on planet Earth. If so, how will we proceed? What can we do to share the space we have left with animals? Do the animals have a right to live in our space, our yard? We need to think carefully before we disturb or destroy any animal's home, even if it's under a rock!

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

The Council of All Beings

Literary Inspiration

Title: Where Once There Was A Wood
Author: Denise Fleming

This book provides a deeply affecting portrait of our disappearing natural environment. The final pages encourage families to become better stewards of the Earth by welcoming wildlife to their own backyards.

Age Group

primary (grades K-2) and intermediate (grades 3-5)

Materials

- miscellaneous art supplies for mask making

Learner Outcomes and Skills

role playing, critical thinking skills, creative expression – art and speaking

Overview

We share the planet Earth with many animals and plants. Each child will focus on just one of these fellow inhabitants. How does that inhabitant feel about all the things that are happening on this planet that we call Earth, and it calls home. In this activity, all participants are asked to "become" a plant, animal, or ecological feature of the Earth and speak for it at a Council of All Beings. By developing an empathy with the Earth, the children will discover a greater understanding and commitment toward it.

Activity

Explain that the Council of All Beings is a meeting of the creatures, plants, and beings that live on Earth. In order to hold a Council, each child will need to assume the role of an animal, plant, or ecological feature such as a river or mountain.

Each child will speak for the role they have chosen during the course of the Council. Together the Council members will discuss their feeling about Earth and its future. The human part of each participant will be asked to listen to the other beings of the Earth and learn from them.

Choosing: Give each person time alone to reflect about the plants, animals, birds insects and other ecological features that share our Earth. Tell them to think and listen, because after a while, a "being" will choose them to speak for it in the Council Meeting.
Roles should not be assigned.

Becoming: When each child has selected a being, they will create a mask or costume to be worn at the meeting. Once the costume or mask is completed and worn, each participant will "become" another being.

The Council of All Beings: The leader of the meeting should take on the role of Chief Seattle and open the council with this brief speech. To begin, have all the beings sit in a circle facing each other.

"*Every part of this Earth is sacred. Every shining pine needle, every sandy shore, every mist in the dark woods, every meadow, and every animal, bird, or humming insect is holy. You are part of the Earth and it is part of you. The perfumed flowers are your sisters; the deer, the horse, the great eagle, these are your brothers. The tall mountain, the stream in the meadow, the body heat of the pony, and man – all belong to your family.*"

"The Earth does not belong to you; you belong to the Earth. All things on this Earth are connected, like the blood that connects one family; so that whatever happens to the Earth, also happens to you. We have gathered here today to speak of our Earth. We want you to hear our words and learn from them."

Allow the beings to come to the center of the circle one at a time, identify themselves, and tell the council how they feel about what is happening to the Earth and how it is affecting them. Then ask each being to express some hope or goal for the future. Before closing the council, have each participant commit themselves to some form of action to accomplish the goals expressed. To end the meeting, have Chief Seattle close with these words:

"This we know. Whatever happens to the Earth happens to all the people of the Earth. Try to imagine the whole Earth as a spider's web. Man did not weave this web of life, he is merely a strand in it. So, whatever he does to the web, he does to himself."

Adapted from Sheehan, K., & Waidner, M. (1998). Earth child 2000. Tulsa, OK: Council Oak Books.

The Heart of Nature

Literary Inspiration

Title: The Little Creek

Author: Jennifer Ward

Enter the world of one little creek that provides a home to a host of plants and animals including beavers, coyotes, birds, and eventually humans. Over time the creek is mistreated, and the people and animals must abandon it, but everything changes when a group of determined children find the creek and restore it to its original magic.

Age Group

intermediate (grades 3-5) and advanced (grades 6-7)

Materials

- copies of The Adventure Hunt Handout
- paper
- pencils and crayons

Learner Outcomes and Skills

awaken wonder and curiosity in the natural world, learn to love and care for nature, personal discovery, use of the physical senses, observational skills, group cooperation, creative expression through writing and art

Overview

The natural world is full of treasures that are waiting to be discovered by each and every one of us. To find this treasure you will need a special outdoor place where you can explore and feel free; a place where you can see animals, hear a bird's song, and feel the wind. Through a series of four activities children will choose and explore a special place in nature. The activities will help children discover an area's uniqueness and beauty. Since the activities complement and build upon each other, they are designed to be done together during the course of one day, or over a period of several days.

Activity

Part 1: The Adventure Hunt

Most people learn about their surroundings using only their eyes, but it can be fun to explore with the other senses too. In this activity, children will be using sight, hearing, touch, and smell to make new discoveries.

Allow the children several minutes to find their special place in nature. Once they have found their place, pass out The Adventure Hunt Handout and have the children fill it out as they explore their special place.

Part 2: Caring for Your Site

Awakening interest in nature is only the beginning of raising environmental concern. By teaching children to love and care for nature in one special place we are encouraging a love and concern for all of nature.

Once the children have learned about their special place it is time for them to care for their site. As a group, choose one project that will meet the needs of your area. Have the children think about the project from the point of view of the plants and the animals. Will it help them? Also, encourage the children to think about the impact their project will have on the area a year from now or seven years from now (you can talk about the importance of the seventh generation to Native American cultures). The following is a list of projects your group may consider in caring for their site:

Water Bars: In an area where water runs rapidly downhill, you can place logs across its path. Placing logs at intervals along the slope slows the water's progress and prevents soil erosion. For each log, dig a diagonal trench across the water's path. Make the trench deep enough so that only two inches of the log stick up above the ground. Make sure the logs are long enough to prevent the water from flowing around them. The logs should also divert the water to an area at the side of the channel where it can be absorbed into the ground. To anchor each log, drives stakes into the ground at each end on the downhill side.

Mulching: If your site has areas of bare dirt or abandoned roads, you can reclaim the soil by mulching. Gather leaves, wood chips, lawn clippings, and other natural materials and spread them over the ground. Mulch protects the soil, absorbs water, and provides food for plants.

Willow Stakes: Did you know that if you plant a willow branch in the ground it will sprout and grow into a new tree? You can start other river trees like cottonwoods and poplars in the same way. If there is a stream in your area you can plant willow stakes along the banks to help stabilize the soil and prevent erosion. The trees will also help to keep the water cool and provide shelter for wildlife.

Natural Areas: This project demonstrates what happens when nature takes back land that humans have used and/or managed. Mark off an area with a boundary (this could be a simple fence made with string and stakes). Create a sign that explains what you are doing. For example: "This area is being reclaimed for nature study." Before long, your area may begin to look wild and neglected. To help nature along, try growing some native plant species (available at a local nursery). As time passes, nature will create a wild garden at your site, complete with insects, birds, and small animals.

Part 3: Sharing Your Site with a Friend

Once the children have had a chance to enjoy their special place by themselves, they may want to share its treasures with others. This is their opportunity to share nature's beauty with a friend by showing him or her the unique features of their site.

Begin this activity by having the children create and send an invitation card to someone they think would enjoy their special place (you may want to have the children address their invitations to another child in the group). Encourage the children to be creative with their invitations. They may want to include a drawing, as well as, a brief description of the area to be explored. Once the invitations have been sent, have the children make a list of all the special places and activities they would like to share with their guest. If time permits, have each child take their guest on a tour of their special place.

Part 4: A Letter to Myself

During the children's visits to their special places they have had many chances to discover new things about nature and about themselves. They have also had the opportunity to witness many natural events. During this activity have the children take some time to write a letter to themselves describing what they have learned (you may want to provide paper with a colorful letterhead, or you can have the children create their own). Here are some questions you may want the children to consider:

1. What things would you like to remember about your special place?
2. What would you like to tell others about your special place?
3. How can you continue to care for your special place?
4. How have you changed?

Answering these questions will give the children a record of the unique moments they have had at their special place. Encourage them to save their letters and re-read them after several weeks. The letters will help them remember what was really important about their special place and about their experience with nature.

Adapted from Cornell, J. (1994). Journey to the heart of nature. Nevada City, CA: Dawn Publications.

The Adventure Hunt Handout

A. Find the best view and give that place a special name. Sketch the view in the space below. Later, you'll have the sketch to share with a friend.

B. Find the best place to listen for nature sounds. Then, see how long it takes to hear at least five different sounds. See if you can figure out what is making the sounds. Write down the sounds:

1.
2.
3.
4.
5.

C. Describe a bird's call or any other natural sound that you hear using words or letters. For example, the call of a California Quail has been described as "Chi-ca-go!"

D. Use your hands to find the warmest and coldest places in your special place. How might these places change during the night?

Warmest place(s): Coldest place(s):

E. Stop at different places. Close your eyes and focus your attention on the sense of smell. Find two different smells and describe them. See if you can figure out where they came from.

1.

2.

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