DOCUMENT RESUME

ED 398 054 SE 058 389

AUTHOR Wilson, Ruth A.
TITLE Natural Beginnings: An Early Childhood Environmental Education Teacher Inservice Workshop.
SPONS AGENCY Ohio State Environmental Protection Agency, Columbus.
PUB DATE 95
NOTE 149p.
PUB TYPE Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC06 Plus Postage.
DESCRIPTORS Conservation (Environment); Early Childhood Education; *Environmental Education; Hands on Science; *Inservice Teacher Education; Investigations; *Teacher Workshops

ABSTRACT

This manual contains an outline of a 4-day teacher training workshop focusing on environmental education at the early childhood level. The overall purpose of the workshop is to stimulate the infusion of environmental education into early childhood programs as a way of fostering in young children an understanding of and appreciation for the natural environment. The format of the workshop represents a hands-on process approach to learning and is based on a problem-solving and investigative instructional approach. The workshop is designed to be implemented over a 4-day period with a 1-day follow-up session scheduled several months after the initial sessions. During the interim, workshop participants are expected to develop and field test an instructional unit with an accompanying activity kit that is to be shared during the follow-up session. This includes introduction, rationale, and purpose and objectives; overview of the workshop; designing the workshop; publicity and recruitment; application and confirmation; workshop outline; additional ideas; time line for participants' responsibilities; evaluation; references; and additional resources. Appendices include funding proposal for the workshop, bibliography of books relating to trees, Project Learning Tree bibliography, storytelling for all ages, and Life Lab curriculum. (JRH)

NATURAL BEGINNINGS

An Early Childhood Environmental Education Teacher Inservice Workshop

Ruth A. Wilson, Ph.D.

NATURAL BEGINNINGS

An Early Childhood Environmental Education Teacher Inservice Workshop

Developed by

Ruth A. Wilson, Ph.D.
Bowling Green State University
Bowling Green, Ohio

Funded by the Ohio Environmental Education Fund,
a program of the Ohio Environmental Protection Agency

1995

DEDICATION

For all who serve as mentors and guides to young children
in their quest to understand the world around them
and
for the natural world, itself,
with all its beauty, glory, and mystery

ACKNOWLEDGMENTS

Developing an inservice program focusing on environmental education for preschoolers was a collaborative endeavor involving colleagues in early childhood education, environmental education, and teacher education. Major contributors include Dona Greene Bolton and Steven McKee who were major presenters for this workshop. Other presenters and contributors include Carolyn Christ, Joyce Davis, Denise Gehring, Vicki Knauerhase, Rolinda LeMay, Pamela Mowbray, Linda Penn, Cindi Rick, Judy VandenBroek, and Marilyn Weiler. Special support was also provided by the Center for Environmental Programs at Bowling Green State University and the members of its high- energy team who gave so willingly of their time and expertise. This team includes Barry Cobb, Justine Magsig, and Eleanor Connor. Another individual who provided invaluable support and assistance to the project is Susan Sheffer, a graduate assistant who attended to so much of the detail work that a project like this entails. Thanks, Sue, you've been a delight to work with! Input from both presenters and participants of the Natural Beginnings workshop was also invaluable in providing direction for the format and content of this handbook.

The financial support that made this work possible came from the Ohio Environmental Education Fund, a program of the Ohio Environmental Protection Agency. Word processing and formatting assistance was provided by Sherry Haskins, College of Education and Allied Profession, Bowling Green State University. Tracy Reid, a graduate assistant during the final phases of the project, also provided a great deal of support. Thanks, Tracy, for your interest and help.

TABLE OF CONTENTS

List of Figures

INTRODUCTION

Presented in this manual is an outline of a four-day teacher training workshop focusing on environmental education (EE) at the early childhood level. While the workshop is designed primarily for preschool teachers, it might also include administrators of early childhood programs and other professionals working with preschool children. This workshop was originally funded through a grant from the Ohio Environmental Education Fund, a program of the Ohio Environmental Protection Agency. While replication of the workshop, as outlined in this manual, is contingent on funding for presenters, workshop participants, and materials, modified versions of the workshop could be offered at minimal expense.

Rationale

Environmental education (EE) at the early childhood level is important to both the development of the young child and the preservation of the natural world. It is also based, in part, on the premise that unless children develop an appreciation of the natural environment during their early years, they are at risk for never developing a sense of respect and caring for the world of nature later in life.

Underlying causes of the present environmental crisis are directly linked to behavior patterns and value systems of individuals who consume and misuse natural resources. The restoration and future protection of the environment, then, depend on the development of an environmental ethic or a sense of responsiblity and caring for the world of nature. Schools can play a major role in the development of an environmental ethic by infusing EE into the curriculum. As lifelong attitudes and values are acquired early in life, the infusion of EE is especially important at the early childhood level (Carson, 1984; Iozzi,1989; Wilson, 1993). Barriers to such infusion, however, include lack of teacher training and inadequate resource materials (Stone, 1989). The Natural Beginnings workshop addresses each of these concerns. Through the Natural Beginnings workshop, early childhood educators will become more aware of how they might foster an understanding and appreciation of the natural environment in young children. Workshop participants will also be involved in developing and field testing new EE materials appropriate for young children.

Purpose and Objectives

The overall purpose of this workshop is to stimulate the infusion of environmental education into early childhood programs as a way of fostering in young children an understanding and apprecation of the natural environment.

Specific objectives of the workshop include:

- fostering teachers' appreciation of nature
- fostering teachers' understanding of the natural environment
- introducing teachers to EE resources appropriate for young children
- fostering partnerships between early childhood educators and community EE resource professionals
- increasing teachers' knowledge, skill, and motivation for instilling understanding and appreciation of nature in young children
- developing confidence in and commitment to teaching EE at the early childhood level.

OVERVIEW OF THE WORKSHOP

Approach

The Natural Beginnings workshop is based, in large part, on a curriculum guide designed to infuse environmental education into all aspects of an early childhood program. This curriculum guide, Fostering a Sense of Wonder During the Early Childhood Years (Wilson, 1993), was developed and field tested through a previous grant from the Ohio Environmental Education Fund (OEEF) and is available through the OEEF at the Ohio Environmental Protection Agency, P.O. Box 1049, Columbus, OH 43216-1049 (Phone: 614/644-2873). The approach to EE at the early childhood level presented by the curriculum guide and emphasized throughout the Natural Beginnings workshop is based on a young child's sense of wonder about the natural world.

Format

The format of the workshop represents a "hands-on" process approach to learning. It is also based on a problem-solving and investigative instructional approach. In addition to ideas on how to infuse environmental education into all aspects of an early childhood program, this workshop is also designed to help preschool teachers become aware of materials and community resources available to them for implementing an early childhood EE program.

The workshop is designed to be implemented over a four-day period with a one-day follow-up session scheduled several months after the initial sessions. During the interim, workshop participants are expected to develop and field test an instructional unit with an accompanying activity kit. Materials developed are to be shared during the follow-up session. Also during the interim, workshop participants are expected to be implementing his or her Action Plan developed during or immediately after the four-day workshop. A part of this plan involves establishing an on-going linkage with a community EE professional and/or program.

DESIGNING THE WORKSHOP

Planning Committee

A planning committee of four or more people should be established to provide direction to the workshop. Individuals on this committee might include an administrator from a community early childhood program, a teacher educator from an early childhood teacher training program, and one or more EE resource professional(s) from the community. The committee could provide input as to presenters for the workshop, possible field trips, and publicity and recruitment initiatives. (See attached letter inviting individuals to serve on the committee and an announcement about an initial meeting.)

INFORMATION FOR PLANNING COMMITTEE

Dear Friend of Early Childhood Environmental Education,

(agency) has recently received a grant from the Ohio Environmental Education Fund, a program of the Ohio Environmental Protection Agency, focusing on environmental education for preschoolers. A major activity of the grant is to develop and implement a teacher inservice workshop. To enhance the implementation of this grant, we are inviting educators, naturalists, and other individuals interested in linking young children with the natural environment to serve in an advisory capacity. We would like you to be a part of this advisory committee.

The advisory committee will be invited to meet as a group once or twice to help plan the workshop. The first meeting is scheduled for (date)_____. (See attached flyer.)

Please let us know if you are interested in being a part of this advisory group and whether or not you will be able to participate in the meeting on ___(date)___. Please call ___(phone)___ for further information and to indicate your interest in being a part of the advisory group.

We're looking forward to hearing from you.

Sincerely,

(name)
Project Director

MEETING NOTICE

Environmental Education For Preschoolers

Advisory Committee

(date and time)

(place)

(contact information)

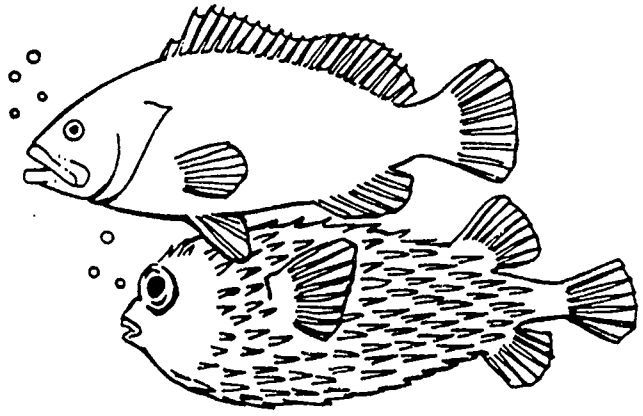
Workshop Leaders/Presenters

Presenters for the workshop should include professionals representing both early childhood education and environmental education. Presenters should have an understanding of developmentally appropriate practices in early childhood education and the importance of environmental education for preschool children.

Presenters should also include some local environmental education professionals who can share information about what resources are available in the community. Once the presenters are identified, their topics, roles, and responsibilities should be clearly specified. A "Presenter's Agreement" form (attached) might be used to provide written confirmation. To facilitate future correspondence, a written list of the presenters, along with contact information, might be provided to the workshop participants. (See Appendix A for a list of presenters for the 1995 workshop conducted at Bowling Green State University.)

While the presenters are of utmost importance to the overall quality of the workshop, the coordinator of the workshop also plays an extemely important role in "pulling it all together." The coordinator oversees all aspects of the planning and implementation of the workshop and serves as a facilitator and "trouble shooter" throughout the entire process. The major tasks of the coordinator are outlined in the "Coordinator's Planning Guide." (See attached.) A suggested timeline for the accomplishment of some of these major tasks is also provided.

An additional role of the coordinator might be to serve as the "link" between the different components of the workshop. Establishing links is especially important for workshops with multiple presenters. A "link" might consist of a five-to-ten-minute introduction to the different sessions. This introduction should not only provide information about the presenter and the topic(s) to be covered during that particular session, but also help the participants see how each session fits in with the overall plan for the workshop.



NATURAL BEGINNINGS WORKSHOP

Presenter's Agreement*

Presenter, (name), agrees to conduct a (specify length) workshop on early childhood environmental education on (date). Topics to be covered will include (specify topics).

Presenter will submit materials to be copied and requests for audio-visual equipment at least one week in advance of the workshop.

Presenter's fee for conducting this workshop will be (specify amount). Mileage will also be reimbursed.

Presenter's signature: _____ Date: _____

S.S. # _____ Phone: _____

Address: _____

_____

Project Director's Signature: _____ Date: _____

*Completed form to be returned to: (name and address)

Coordinator's Planning Guide

Before training

_____ Secure funding (if applicable) (See Appendix B for a copy of a funding proposal)

_____ Identify and establish contractual agreements with presenters*

_____ Arrange for professional training credit (e.g., Continuing Education Units or college credit) (optional)

_____ Arrange for setting(s) (including meeting room, field trip sites, tables and chairs, audio visual materials and equipment, lunch and other refreshments, etc.)

_____ Prepare informational flyers and registration forms (with deadline for registration)*

_____ Disseminate flyers and registration materials to target audiences (may include teachers working in a variety of early childhood programs, including Head Start, day care centers, and public school preschool and kindergarten/primay programs)*

_____ Send confirmation letters to participants. (Include directions to site, interest/skill survey, application for parking permit, application for credit, and Survey I)*

_____ Collect/prepare materials needed for activities (e.g., drawing paper, crayons, etc.)

_____ Prepare participant folders (including agendas, handouts, Survey II)*

_____ Prepare a sign-in sheet for each day

_____ Prepare Order Forms for resource materials*

* Sample Forms Attached

Coordinator's Planning Guide
(continued)

During training

_____ Have participants sign in each day of training

_____ Provide each participant with a workshop folder of materials

_____ Explain credit option (if applicable)

_____ Explain participant responsibilities (as outlined on Part Two of Application Form)*

_____ Introduce the speakers and their topics

_____ Provide information and ideas on how the different sessions link with each other and to the overall plan of the workshop

_____ Discuss field trip arrangements (if applicable)

_____ On Day Four, have participants complete Materials Order Form* and Survey II*

_____ Share information about date and agenda for "Follow-up Day"

After training

_____ Process stipends and materials fee

_____ Order materials (as specified on Materials Order Form* from participants)

_____ Send reminders and directions for Follow-up Day

_____ Conduct Follow-up Day Activities

_____ Administer Follow-up Survey (Survey III*)

* Sample Forms Attached

Suggested Timeline

Activity	Time in Relation to Workshop
Develop grant proposal (if applicable)	12-24 months prior
Establish planning committee	9-12 months prior
Establish contractual agreements with presenters	6-8 months prior
Arrange for professional credit (optional)	6-8 months prior
Establish training site(s)	6-8 months prior
Invite community EE resource professionals to display materials & meet with participants during the workshop	4-6 months prior
Disseminate flyers & registration materials	4-6 months prior
Send confirmation letters & pretest to participants	2-3 months prior
Send confirmation letters to presenters	1 month prior
Send confirmation letters to community EE resource professionals	1 month prior
Collect/prepare materials for workshop	1 month prior
Administer Survey II	Last day of workshop
Process stipends, materials fee, and payment for presenters	1-2 weeks after
Process orders for materials	1-2 weeks after
Conduct Follow-up Day	2-4 months after
Administer Survey III	6-8 months after
Prepare final reports (if applicable)	9-10 months after

PUBLICITY AND RECRUITMENT

Publicity

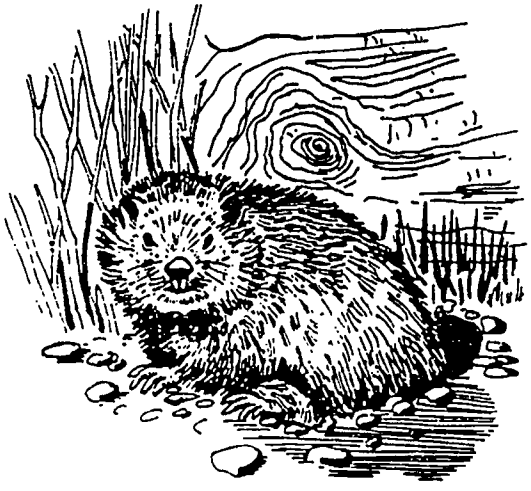
Publicity for the workshop should be designed to accomplish several different goals. In addition to recruiting individuals to participate in the workshop, publicity should also help inform the public about the importance of environmental education at the early childhood level. Flyers announcing the workshop, then, should include some information about the purpose and overall goals of the workshop.

In addition to direct mailings to preschool programs, announcements about the workshop could also be published in the local newspaper and the newsletters of professional organizations, such as the local chapter of the National Association for the Education of Young Children (NAEYC). Contacts might also be made with teacher training programs in the area.

Recruitment

For recruiting purposes, publicity should target early childhood programs, including day care centers, Head Start, and public and private preschool programs. Another target group could be preservice teachers in early childhood education programs.

Initial flyers about the workshop could include a tear-off response sheet inviting individuals to indicate interest in participating in the workshop. (See sample of initial flyer and accompanying letter.) Completed response sheets can be used to generate a list of names and addresses of individuals who will then be sent a complete application packet. This list will provide some indication of how many people are interested in participating in the workshop and plans can be made accordingly. Ideally, participation in the workshop will be limited to 25 to 30 individuals.



Initial Flyer

NATURAL BEGINNINGS
An Early Childhood Environmental Education
Teacher Inservice Workshop

(date)

Offered by
(agency)
With funding from the
Ohio Environmental Education Fund
A Program of the Ohio Environmental Protection Agency

The workshop will be provided without cost to the participants and will be designed to accommodate 25 early childhood educators. Workshop participants will receive a stipend for participation and a materials allowance for developing an EE activity kit.

If interested in participating, please complete and return the attached pre-application form to (name and address). For questions, call (phone number). More detailed information and complete application materials will be available in (date).

Please note: Final selection for participating in the workshop will not be made until all application materials are submitted and reviewed.

Early Childhood Environmental Education Workshop
Pre-Application Form

Name _____

Address _____

_____

Phone _____ (H) _____ (W)

Present Position _____

School/Agency _____

Accompanying Letter

Dear

(agency) will be offering a summer workshop focusing on environmental education for preschoolers (date). Participation in this workshop is open to early childhood educators throughout Ohio.

The workshop will be provided without cost to the participants and will be designed to accommodate 25 early childhood educators. Workshop participants will receive a stipend for participation and a materials allowance for developing an environmental education activity kit.

Please feel free to disseminate the attached announcement and/or to place a notice in your newsletter.

For further information, contact (name, address, phone number).

More detailed information and complete application materials will be available (date).

Thank you for your interest.

Naturally,

(name)
Project Director

Incentives and Responsibilities for Participation

Incentives for participating in the workshop could include a $200 stipend and a $40.00 voucher to purchase early childhood environmental education resource materials. These materials become the property of the participants, so as to assit them in building a personal resource library for EE activities. The materials stipend has the added benefit of encouraging the participants to carefully review the many resource materials available, so they might make the best choices. While orders for these materials are processed after the fourth day of the summer workshop, participants receive the materials during a follow-up session scheduled several months after the workshop.

Responsibilities accompanying participation in the workshop include:

- a commitment to participate in all four days of the scheduled workshop and a one day follow-up session
- a commitment to developing and field testing an early childhood environmental education unit, which includes an activity box or book bag
- a commitment to developing an Action Plan for establishing an on-going partnership with a community environmental education resource professional and/or agency
- a willingness to participate in a program effectiveness study, primarily by way of questionnaires administered before and after the workshop
- a commitment to sharing information about environmental education resources and ideas with other teachers and parents
- a commitment to infusing environmental education into their early childhood program by introducing nature-related activities and materials in both the indoor and outdoor environments
- a commitment to making their early childhood program more environmentally responsible (through recycling etc.)

These responsibilities are outlined in the application packet. Applicants are asked to provide a written commitment to carrying out these responsibilities. They are also asked to secure the signature of their immediate supervisor as a way of informing them of the responsibilities related to the workshop. (See Part III of the Application Packet provided in the following section.)

APPLICATION AND CONFIRMATION

Application

The application packet consists of three different forms: one to collect contact information about the applicant (name, address, place of employment, phone, etc.); one outlining the expectations of workshop participants; and one designed to collect information about the applicant's motivation for participating. Information about the applicants' motivation for participating and their plans for how they intend to use the information from the workshop can be used to screen the applicants should there be more applications than space available.

A cover letter accompanying the application packets should include (1) the due date for when completed applications should be returned, (2) information about where to return the completed applications, and (3) the name and phone number of a contact person. An information sheet about the workshop should also be included in the application packet. The information sheet should include the times and dates of the workshop, information about incentives and expectations (i.e., participant responsibilities), the availability of training credit (if applicable), and the location of the workshop.

Following is an example of a complete application packet.

APPLICATION PACKET

COVER LETTER

Natural Beginnings Workshop
(date)

You previously received information about the "Natural Beginnings" workshop and indicated interest in participating. We are pleased with your interest and would love to accommodate everyone. Enrollment, however, is limited to 25. Therefore, if you are still interested in participating in this workshop, we ask that you complete and return the attached application materials by (date) We anticipate screening of the applications to be completed by (date) and confirmations to be made by (date).

Please note that there are <u>three</u> separate forms which must be completed.

If you have questions about the workshop or the application process, please call (name, phone number).

Your completed application should be returned to:

(name)
(address)

INFORMATION SHEET

NATURAL BEGINNINGS WORKSHOP
(site/institution)
(date)

General Information and Objectives

The Natural Beginnings workshop is designed to encourage the infusion of environmental education into early childhood education programs. Specific objectives include:

- fostering participants' understanding and appreciation of nature
- increasing participants' awareness of the availability of quality environmental education materials
- fostering partnerships between early childhood educators and environmental education resource professionals
- increasing participants' knowledge, skill, and motivation for instilling understanding and appreciation of nature in young children
- fostering participants' confidence in and commitment to teaching environmental education at the early childhood level.

While the primary location of the workshop will be (site) several off-campus field trips are also being planned.

Participants will receive a $200 stipend and a packet of materials relating to environmental education at the early childhood level. Participants must meet all the requirements outlined on the attached form.

Academic Credit (Available, but not required)

Two semester hours of graduate or undergraduate credit will be available to qualified participants. To receive university credit, participants must complete course registration forms, pay tuition fees, and complete an independent assignment. Course registration forms will be available upon request.

Sponsors/Contacts

This workshop is funded through a grant from the Ohio Environmental Education Fund, a program of the Ohio Environmental Protection Agency.

For questions or additional information, please contact:

(name)
(address)

OEEF
OHIO ENVIRONMENTAL EDUCATION FUND

Natural Beginnings Workshop Application
Part One

Name _____

Home Address _____

_____ Zip _____

Phone _____ SS# _____

School Name/Location _____

School Phone _____

Position: _____ Teacher ____ Administrator _____ Other_____

Supervisor or other colleague (for reference) _____

How long have you been working as an early childhood educator? _____

Age of students: _____ Total # of students in current class(es): _____

Educational Background: _____ _____
Highest Degree Date Received

Major Field(s) of Study: _____

Do you wish academic credit for participating in this workshop?
_____ Yes _____ No (Your response here will not affect your application.)

Do you have any disability that requires special materials or services?
_____ Yes _____ No (Your response here will not affect your application.)
If yes, please describe.

Do you have a special diet need?
_____ Yes _____ No (Your response here will not affect your application.)
If yes, please describe.

Natural Beginnings Workshop Application
Part Two

Please give a brief statement of your reasons for wanting to attend this workshop and your anticipated use of the subject in the future.

Applicant Name _____ Date _____

Natural Beginnings Workshop Application
Part Three

Following is a list of criteria for participating in the Natural Beginnings workshop. If you meet all the criteria and wish to participate, please complete and return this form along with the rest of your application materials. (An extra copy of this form has been provided for your records.)

- Commitment to participate in all four days of the scheduled workshop, (date) and a one-day follow-up session (tentative date is [date])
- Commitment to developing and field testing an early childhood environmental education unit, which will include an activity box or book bag. (A $100 materials allowance will be provided for this project. The activity box or book bag will become the property of your school/agency.)
- Commitment to developing an Action Plan for establishing an on-going partnership with a community environmental education resource professional and/or agency
- Willingness to participate in a program effectiveness study, primarily by way of questionnaires administered before and after the workshop
- Commitment to sharing information about environmental education resources and ideas with other teachers and parents
- Commitment to infusing environmental education into your early childhood program by introducing nature-related activities and materials in both your indoor and outdoor environments
- Commitment to making your early childhood program more environmentally responsible (through recycling etc.)

I meet all the above criteria and agree to implement the related activities, if given the opportunity to participate in the Natural Beginnings workshop.

Signature _____ Date _____

Signature of supervisor/
administrator
of your program _____ Date _____

Confirmation

After the due date for receiving applications, a screening committee should be formed to review the completed applications. This step may not be necessary if the number of applications does not exceed the spaces available for workshop participants. Questions used in guiding the review process might include the following:

1. Is the applicant currently an early childhood educator or a student in an early childhood teacher training program?

2. To what extent does the applicant seem committed to incorporating environmental education into their early childhood program?

3. To what extent does the applicant seem capable of developing new materials to enhance environmental education at the early childhood level?

4. To what extent has the applicant outlined a reasonable plan for incorporating environmental education into their early childhood program?

5. Has applicant obtained the signature of a supervisor or colleague to support his or her application?

Once the review process is completed, notification letters and related information should be sent to all applicants (see attached). These letters should be sent at least six weeks prior to the scheduled workshop. This advance notice will allow participants time to make any arrangements that may have to be made (e.g., time off work, child care arrangements, etc.). Included in this confirmation letter should be information about time and place of first meeting, what to wear (e.g., comfortable clothes) and what to bring (notebooks, etc.), arrangements for lunch and other refreshments, tentative four-day schedule, date of scheduled "follow-up" day, and registration materials for indivduals wishing to take the worksheet for training credit (if applicable). An application for a parking permit (if applicable) might also be included. The pretest survey (Survey I) should be sent at this time, with directions for when and where to return the survey. (See Evaluation Section for a copy of Survey I). A "Survey of Nature-Related Skills" might also be included with the confirmation letter. This survey is designed to collect information about any special nature-related information and/or skills participants might have that they could share with the group. Opportunities for such sharing might then be included in the workshop schedule.

A list of workshop participants, along with contact information, might be included in the workshop packet. This list might be helpful in making carpooling arrangements, etc.

Individuals not selected to participate in the workshop should also receive a letter at this time. Such individuals could be placed on a waiting list and notified of such, in the event that one or more of the selected participants would need to cancel.

Following are sample materials for the confirmation packet.

CONFIRMATION MATERIALS

Acceptance Letter

(date)

Dear _____,

Congratulations! You have been selected to participate in the "Natural Beginnings" workshop!

Enclosed is a tentative schedule of the four-day workshop, a map highlighting the location, and some general information about the workshop.

We're looking forward to seeing you at the workshop! If for some reason you cannot participate in this workshop, please notify us as soon as possible, as there are others on a waiting list who would like to participate.

Questions, concerns, and/or comments can be addressed to:

_____ *at* _____

(name) *(address and phone number)*

Enclosures

NATURAL BEGINNINGS WORKSHOP

General Information

Workshop Dates:	(date and times)
Location:	(site)
Contacts:	**Project Director** (name and contact information) **Workshop Assistant** (name and contact information)
What to Wear:	Comfortable clothes, including walking shoes
Sponsored By:	The Ohio Environmental Education Fund, a program of the Ohio Environmental Protection Agency

OEEF
OHIO ENVIRONMENTAL EDUCATION FUND

Workshop Outline

Day One

Overview of the workshop
Rationale, Goals, and Objectives
Nature and Focus of Environmental Education at the Early Childhood Level
Guidelines and Suggestions for Fostering a Sense of Wonder
Multicultural Perspectives
Children's Environmental Literature

Day Two

Learning About Nature
Exploring the Natural World
Animals in the Classroom

Day Three

EE Community Resources
Developing Partnership Action Plans
Developing EE Units

Day Four

Project Learning Tree
Developing an Environmental Yard

Follow-Up Day

Show and Tell of Activity Kits and Books Bags
Update on Implementation Plans

Application for Credit

NATURAL BEGINNINGS WORKSHOP
(dates)

If you would like to take this workshop for college credit (2 semester hours), please complete the following and return with your survey.

Status: _____ graduate _____ undergraduate

Currently a student at the university? _____ yes _____ no

Name _____

SS# _____ Birthdate _____

Address _____

City/State/Zip _____

Please note: Students taking this workshop for credit will be expected to complete an additional independent project focusing on adaptations for children with special needs.

Application for Parking Permit

NATURAL BEGINNINGS WORKSHOP
(dates)

Parking on campus is by permit only. We can get a permit for you if you can provide the following information to us in advance.

Name _____

Address _____

City/State/Zip _____

Make of car _____ Year _____ License # _____

Please note: If you do not know which car you will be using, you can stop at the visitor's center when you arrive and get a one-day permit.

If you do know which car you will be using, please complete and return this form with your survey. We will then get a permit for you. It will be either mailed to you before the first day of the workshop, or be available when you arrive.

Survey of Nature-Related Skills
(Optional)

Your name _____ Phone _____

As sharing will be an important part of this workshop, we are interested in any special nature-related information and/or skills you would be willing to share with the group. To facilitate this sharing, we are inviting you to complete and return the following survey. This is entirely optional.

Special nature-related information and/or skills (appropriate for adults and/or children) I would be willing to share:

_____ herb gardening

_____ flower gardening

_____ vegetable gardening

_____ bird watching/identification

_____ nature-related art

_____ nature-related music

_____ story telling/children's literature

_____ nature-related drama/ dramatic movement

_____ photography

_____ journaling/essay writing

_____ outdoor activities

_____ composting

_____ other _____

_____ other _____

_____ other _____

Comments:

Rejection Letter

(Date)

Dear _____,

I am sorry to inform you that you were not selected to be one of the participants for the "Natural Beginnings" workshop. We had far too many applicants for the space available. Priorities for selecting participants were as follows:

- curently teaching preschool children, age 3-5
- currently serving as a supervisor in an early childhood education program for children, age 3-5
- materials submitted with application indicated strong potential for (a) infusing environmental education into the early childhjood curriculum, and (b) sharing early childhood environmental education ideas and materials with others.

After these priorities were considered, priority was given to applications received on or before the application deadline. If you have questions or comments about this process, please feel free to call me (phone number).

Please know that we regret having to say "no" to anyone interested in participating in this workshop. We will try to offer similar workshops in the future and will inform you of any available. We will also keep your name on a waiting list and, if an opening should occur, we will begin contacting individuals on this list.

Sincerely,

Project Director

Workshop Outline

Day One

Registration

Approximately one-half hour should be planned for registration activities. During registration, workshop participants should sign in, receive their name tag, folder of materials, and a copy of the curriculum guide, Fostering a Sense of Wonder During the Early Childhood Years. Copies of this curriculum guide are available through the Ohio EPA, P.O. Box 1049, Columbus, OH 43216-1049. Phone: 614/644-2873.

Overview

Day One should start with an overview of the workshop. This overview should be presented by the coordinator and should include a discussion of the major goals and objectives of the workshop. Both cognitive and affective goals should be presented. These goals were previously outlined in the description of the workshop. (See page 2).

The overview of the workshop should also include a discussion about the nature and focus of environmental education at the early childhood level. Workshop participants might be referred to the first three paragraphs of the "Preface" section of the curriculum guide (p. xi) for a related discussion. The following selection from the poem "Leaves of Grass" by Walt Whitman might also be shared at this time as a way to emphasize the importance of linking young children with the natural world.

There Was a Child

There was a child went forth every day,
And the first object he look'd upon, that object he became,
And that object became a part of this child,
And the grass and white and red morning-glories, and
white and red clover, and the song of the phoebe-bird,
And the third-month lambs and the sow's pink-faint litter, and
the mare's foal and cow's calf,
And the noisy brood of the barnyard or by the mire of pond-side,
And the fish suspending themselves so curiously below there,
and the beautiful curious liquid,
And the water-plants, with their graceful flat heads, all
became part of him.

(W. Whitman)

Fostering a sense of wonder

It is also important during the the overview of the workshop to introduce Rachel Carson's book, The Sense of Wonder. A brief description of the book should be provided and the following quotation from the book shared:

The Sense of Wonder

> If I had influence with the good fairy who is supposed to preside over the christening of all children I should ask that her gift to each child in the world be a sense of wonder so indestructible that it would last throughout life, as an unfailing antidote against the boredom and disenchantments of later years, the sterile preoccupation with things that are artificial, the alienation from the sources of our strength. If a child is to keep alive his inborn sense of wonder . . . he needs the companionship of at least one adult who can share it, rediscovering with him the joy, excitement and mystery of the world we live in.
>
> (R. Carson)

Workshop participants could also be referred to Chapter 3 (pp. 13 - 23) in the curriculum guide (Fostering a Sense of Wonder During the Early Childhood Years) for guidelines and suggestions for implementing an early childhood environmental education (ECEE) program based on the concept of a sense of wonder.

Environmental Awareness for Early Childhood Educators

(This section of the workshop was developed by Dona Greene Bolton and based on her publication, "Environmental Awareness for Early Childhood Educators," published in Environmental Education at the Early Childhood Level [Wilson, 1994, pp. 66-75].)

Getting to know each other. After the introduction to the workshop and the topic for the day, some time should be spent allowing participants to get to know each other a little better. One activity designed to get people interacting and reflecting on their own nature-related childhood experiences involves having the participants divide into three different groups based on the type of environment (rural, suburban, or urban) in which they spent a great deal of time as a child. While in these groups, participants share one of the earliest memories of their interactions with the natural world. A recorder in each group takes notes and, after about 20 minutes, the larger group reconvenes and recorders share some of the highlights of what was discussed in the smaller groups.

Dealing with fears, dangers, and cautions. Following this group sharing experience, teachers (i.e., the workshop participants) are asked to reflect on the issue of their own nature-related fears (e.g., spiders, snakes, bats, lightning, wind, etc.) and are advised to be honest about such feelings. They are asked to reflect on both what they feel and what they think in regards to those th' ngs that they fear. They are encouraged not to feel guilty about how they feel, but to seek more information.

In taking children on outdoor excursions, teachers are reminded about the following dangers and cautions:

- Avoid contact with dangerous plants which include poison ivy, poison oak, and poison sumac. Teachers should know what these plants look like and where they are likely to grow. Teachers should share the same information with the children and hold them responsible for watching where they go.

- Children should learn not to eat things from nature, without permission from adults.

- Children should wear sun screen and insect repellent when needed. Parents can be asked to put this on their children before sending them to school.

- Teachers should carry (or have handy) first aid supplies, including insect bite treatment.

- On outings or nature walks, children should be held responsible for their own backpacks, which should include non-leaking water bottles, a collection bag, a change of clothing (e.g., long pants if wearing shorts or shorts if wearing long pants) and a trail snack (if appropriate). Sketching pads and small pencils might also be included.

Sharpening sensory awareness. Teachers are also reminded about their own need to revive and sharpen their sensory awareness. A walk through a natural area at this point in the workshop would be appropriate. A technique that might be used to pair up as "trail buddies" involves the matching of tree-related items. Enough different paired items (e.g., 2 pine cones, 2 seed pods, 2 walnuts, 2 acorns, etc.) are placed in a bag for each teacher to reach in and pick one. Partners are then determined by matching items. While on the nature hike, teachers are encouraged to use all their senses to put them in touch with nature—smell the earthy scent of decaying leaves, feel the caress of leaves on the trees and bushes as you walk by, hear the squirrel as it scampers up the tree, and see the different patterns of light and shadow as you walk among the trees.

Teachers should be reminded that, while on a nature hike, it's not important to know all the names of things, but that it is good to help children become good observers of nature-related things in their neighborhood. One idea to focus closer attention on native plants is to press samples, have them laser printed and laminated on heavy paper, and then put the pages in a three-ring binder. This "field guide" can then be taken on hikes and identifications made.

At times, to emphasize the importance of quiet for listening to nature-related sounds, a white-flag signal might be used to draw attention to something interesting or especially pretty along the trail. The white flag is used instead of speaking loudly to the group to get them to focus on a particular thing. Adults and children use the white flag as they have something to share. An alternative to the white flag is a hand raised.

Walking sticks might also be used, but only after children are cautioned about the appropriate use of the sticks. They are to be used only for walking—not poking or hitting, and never carried while running.

If anything living is collected while on the hike, it is always returned. Sometimes a simple song or rhyme is used to remind children about this rule.

Example: A hunting we will go;
A hunting we will go;
We'll catch a bug & give him a hug,
And then we'll let him go.

Children's literature. In addition to introducing children to the natural world through observation and first-hand sensory experiences, children can also learn much about the natural world through children's literature with environmental themes. There are some excellent multicultural children's books, which not only help children learn about different aspects of the natural world, but also introduce them to another way of thinking about and relating to nature. See Appendix C for a bibliography of selected children's books on trees.

Introducing other perspectives. Introducing children to the idea of seeing things from another perspective can also be done through puppets and "conversations" with real animals in their environment. A puppet can be given a distinct personality and be used to impart factual information about the animal represented. Information is usually imparted through "conversations" with the puppet. "Conversations" with real animals work as well and are sure to hold the interest of the children. Conversations can include questions ("Mrs. Rabbit, how would you like a carrot for breakfast?") or statements ("Jimmy Cricket, I bet you weren't this quiet last night.")

Other perspectives can also be introduced through personifications, where the teacher and/or children pretend to be something else in nature. They then talk about, or demonstrate through pretend play, how they would feel or act if they were that thing in nature (e.g., raindrop, tree, etc.) Several books that might be used along with this activity are from the "Who Am I?" series (Santillana Publishing).

The teacher's role. Teachers should be reminded about the power of their attitudes and actions for influencing the way children think about and relate to the natural world. Teachers should lead the way in demonstrating respect for and conservation of the natural world and should do this throughout the day through such activities as recycling, reusing, and reducing.

It is also imperative for teachers to build a sense of group cooperation and trust before attempting outdoor excursions. A group that thinks together, cares for one another, and respects the teacher as a role model will be a joy to take anywhere. Developing group cooperation and trust can be accomplished in many subtle ways.

One idea, presented in the Hug a Tree publication (Rockwell, Sherwood, & Williams, 1986), suggests taking a blindfolded friend on a tour of a tree. After examining the tree through touch, smell, etc., the blindfold is removed and the friend invited to identify the tree she/he just explored. The partners can then work together to find the tree's brothers and sisters (i.e., others of the same species). They can also work to identify the tree's friends (i.e., other types of trees in the area).

When a teacher shows respect for individual differences and plans for those differences by incorporating the unique characteristics of each child to advantage, group cohesiveness begins. One child may be a natural leader and another have very sharp eyes, while another is very helpful. Both special needs and special abilities should be recognized and respected.

A group activity that might be used to demonstrate and foster cooperation involves a dramatization of the "Spin, Spider, Spin" song from a recording of the same title (Zetlin & Berman, 1974). As the song describes a spider spinning its web, the children take thick rug yarn and start attaching it to different structures around the room. All children cooperate to build a web that will entrap the butterfly, a part that can be played by the teacher after the structure is complete.

Thoughts and recommendations for outdoor education.

(This section is taken from "Environmental Awareness for Early Childhood Educators" [Bolton, 1994, pp. 73-75].)

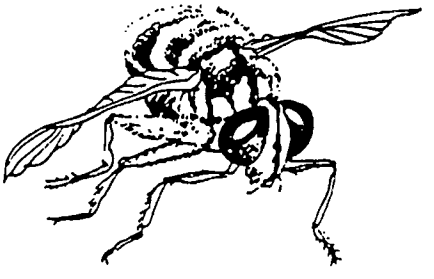
While the following recommendations can be modified to fit individual teaching styles, they might be used as a guide for getting started.

- Emphasize learning by doing, discovering, smelling, touching, or playing a game.
- Let your group teach you, and acknowledge this to the group.
- Encourage curiosity and let children find their own items of interest.
- Encourage questioning. Be a "question asker" as a model, but beware of seeking "right" and "wrong" answers.
- Be willing to get dirty.
- Bring your sense of humor.
- Be open to work with unexpected situations—don't disregard that mushroom just because you're on a bird walk.
- Conversely, don't lose sight of your objectives and the processes you want to stress.
- Be careful with identification. Labels are usually forgotten, can create a distance, and can be difficult for those of limited intellectual abilities. It is more important to identify what it smells like, what it feels like, where it grows, etc.
- Learn a few common names of plants, animals, etc. Learning a few names is not difficult; but don't worry if you don't know a name.
- Show children how to use field guides. Make this a part of the learning process.
- Maintain a leader/student ratio of 1:9 or less for best results in the outdoors. Parents and other teachers can be co-leaders if they have been oriented to your outdoor education approach.
- Speak in terms the children can understand. Relate their outdoor experience to home, family, peer group experiences, and other things familiar to the children.
- Try to use all of your senses, and teach the children to do the same.
- Be cautious when touching and tasting. Never taste anything you are not sure of. Be certain you and your group are able to identify poison ivy and/or poison oak.
- Relate outdoor excursions to the regular classroom experience. Adequate pre-site orientation and post-site review are critical.

- When possible, let the children play in the natural setting with natural materials, in and out of the classroom. Follow their lead for they are the natural scientists.

- Because guest specialists (e.g., naturalists, veterinarians, etc.) often have difficulty relating to young children, be prepared to help the guest focus on things relevant to your group, often by rephrasing and simplifying what they say.

- Keep safety in mind at all times. When walking single file along a stream bank, consider using a long knotted rope with eighteen knots, so that each child can space him- or herself appropriately. Let the children know what you expect of them, but avoid introducing too many rules at once. It's best to explain the rules as they are needed. Identify poison ivy immediately and follow the rule, "Leaflets three, let them be." For bees in flowers, you might use, "Leave them alone and they will fly on home" (from the song "That is the Way of the Bees," on the Spin Spider Spin album). Be aware of children's allergies, and have a first aid kit and trained red cross adult on all outings. Model relaxed exploration and enjoyment. Remember that accidents are more prone to happen when the leader is apprehensive.



- Remember that community resources are an important part of any environmental education program. Tap into these resources. Places to visit include the school yard, the neighborhood, nearby parks, forests, ponds or streams. Natural history museums, zoos, aquariums, farms, water treatment plants, recycling plants, and children's museums are fountains of information with some being more hands-on than others. Resource people can also be found at universities and colleges, nature centers and preserves, the county extension service, parks, and your library.

- Keep in mind the following understandings as you work with young children in the out-of-doors. Let these understandings guide your plans, actions, and interactions.

  1. Children cannot play with or be in nature without physical involvement. The natural world beckons the child to act upon it, engaging all the senses.

  2. The natural world stimulates creativity, inviting the child to use his/her own ideas.

  3. Imaginative and dramatic play are stimulated by the availability, familiarity and flexible character of natural materials.

  4. Natural materials allow the child to work on the concepts of power, strength, love, and caring.

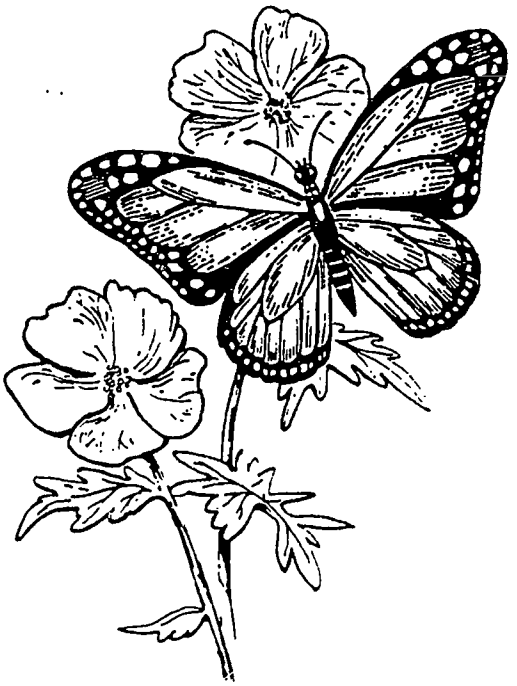
Day Two

The second day of the workshop is designed to help teachers (1) learn more about the natural world, (2) become familiar with simple techniques for exploring the natural world with young children, (3) learn more about the use and care of animals in the classroom, and (4) become familiar with a variety of community EE resources. While the coordinator should provide an introduction and overview of the day, most of the workshop activities for this session might be lead by a naturalist experienced in working with preschool children and leading teacher inservice activities. The last hour of the day could be devoted to interactive sessions with community EE resource personnel. (See pp. 73-75) for a discussion of making the arrangements for community EE personnel involvement.)

As the focus of Day Two is on the natural world, itself, the following statement based on Native American philosophy might be used to introduce the theme of the day.

> *The world is a library and its books are the stones, leaves,*
> *grass, brooks, and the birds and animals that share,*
> *alike with us, the storms and blessings of the earth.*

While most presenters develop their own outlines and activities for specific workshops, the following outline is presented as a suggestion of topics and activities which seem to match well the environmental education needs and interests of early childhood educators.



LEARNING ABOUT THE NATURAL WORLD
Developed by Steve McKee

Introduction and Philosophy

Introduction

1. If you had the time, name one thing that you would like to learn about the natural world—e.g., to identify trees, or bird songs, or slime molds. Take time for each person in the group to share.

2. Overview of the workshop—based on application survey results (i.e., what you hoped to learn and experience through the workshop).

Philosophy

1. Childhood memories: What nature or science lessons do you remember from your early childhood years (preK - 6)?

   Share own memories and experiences. Write group list and save for later.

   List will likely be quite short. Comment on how most of us remember so little and on the challenge of making nature education and science fun and memorable for students.

2. Childhood imperatives: What makes school and learning fun and memorable?

   List ideas from the group. Then share past ideas from the following list.

   - being with friends
   - doing activities
   - meets their interest
   - feeling independent
   - learning new things
   - investigating
   - having fun
   - experiencing success
   - getting personal attention

   Summarize above characteristics into five elements and describe each. (See attached.)

Five Elements of Meaningful Lessons

1. **Activity**

Doing something: watching, touching, smelling, measuring, recording, feeding.

2. **Investigation**

Involves careful examination: scrutiny, searching inquiry, exploration.

Results in discovery learning: things a student learns on his own, without being spoon-fed by an adult. (It's hard to come up with this kind of activities, but it's worth it.)

Example: Which would lead to more inquiry, investigation and discovery learning: (a) having a little lecture about cold-blooded animals followed by touching one, or (b) discovering that a turtle is cold compared to your warm cheek, and then talking about cold-bloodedness?

Compare: We usually teach science by providing a principle that we want the students to learn (abstract first), and then doing an exercise to demonstrate that principle (concrete second). An investigative approach would start with the concrete, then move to the abstract.

Example: Young children can know two turtles, but the number "2" is abstract.

Remember: (a) "The best teachers are the ones who can remember what it was like to be a kid." (b) "Every time we 'teach' a child something, we keep him from discovering or inventing it for himself." (Piaget)

3. **Social Interaction**

Remember the few times you got to work together on a problem, rather than sit with your hands folded listening to the teacher? An example of social interaction occurred when students got in small groups to decide if turtles could come out of their shells. This activity was prompted by one student's question and resulted in extended discussion and social interaction.

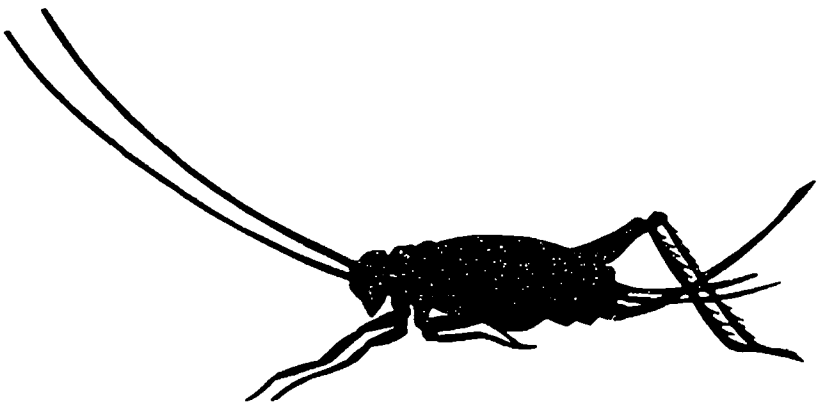
4. Adventure

We all seek things to make our heart beat faster. Kids love the adventure of learning, but if they're not getting it with the lesson, they'll get their faster heart beat some other way. An example of adventure involved watching a grasshopper jump over an increasingly-higher pile of blocks.

5. Usefulness

Usefulness is hard to define but seems to be generally understood. Usefulness has to do with what is relevant to the student, what is age appropriate, what intersects with the world and home life that the student knows. We can all probably think of many hours where we were fed abstract information that never did and never will mean anything to us. As teachers, it's probably easier to come up with lessons that are not useful (e.g., the names and parts of things) than lessons that are useful.

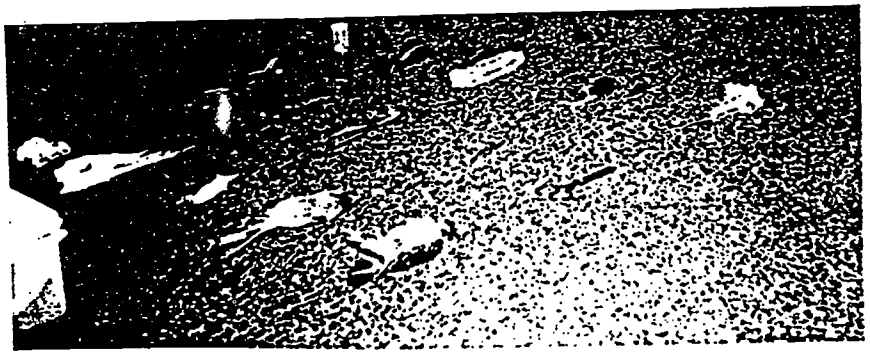
A quote from Rachel Carson (1984) provides support to "real versus abstract" environmental learning: "I sincerely believe that for the child, and for the parent seeking to guide him, it is not half so important to know as to feel. If facts are the seeds that later produce knowledge and wisdom, then the emotions and the impressions of the senses are the fertile soil in which the seeds must grow."



Bird Beak Lesson
(Example of a Lesson Incorporating the "Five Elements")

Show five different kinds of bird beaks, five matching tools, and five matching foods. Have workshop participants match the beaks to the tools to the food.

Discuss how the "Bird Beak Lesson" incorporates the "five elements."



Hands-On Session

Power of observation. Have half of the group stand in a circle. Pass leaves out to each person in the circle. Collect the leaves, and then pass the pile of leaves around with each person picking their own. (It will be very difficult for each person to identify their own leaf.) Do the activity again with the other half of the group. This time ask the group to look carefully at their own leaf so that they will be able to identify it when passed around in a pile. (It will be much faster and easier this time for each person to identify his or her own leaf because of the prompt to carefully observe the leaf.)

Hands-on activities. Introduce each of the following hands-on activities with the logic behind it.

1. "Please Touch" Table. Add plant or animal items (e.g., popcorn, snow, soybeans, leaves, pine cones, etc.) to the texture table. Or set up a table with a collection of interesting nature-related things to touch and explore (e.g., snake skin, shells, animal bones, seed pods, etc.).

2. Squish Art. Provide a bag of natural items freshly picked (e.g., leaves, flower petals, etc.), clipboards, and pictures to color. Pictures that will work best are those that are simple (without much detail) and large (see attached examples). The object of this activity is to color the picture using only the materials from nature. "Squishing" the leaves and flower petals releases a colored "juice" that can be used to "paint" the picture.

3. Beat-a-Leaf. Provide a bag of plant material (leaves, flower petals, etc.), soft white cloth squares, hammers, wooden boards for backing, and tape. Place the plant material on a board, tape a cloth square over it, and use the hammer to pound (gently) over the area of the plant material. "Juices" from the plant material will be released and leave an imprint on the cloth.

4. Sounds that Match. Using 35mm film canisters, make matching "sound sets" by placing small nature-related materials inside each container. Items that might be used include rice, dry beans, watermelon seeds, sunflower seeds, sand, pieces of egg shells, etc. The object of this activity is to enhance one's listening skills and learn about natural materials.

5. Temperature Measurement. Measuring temperature is usually too abstract for most young children, especially when using number scales. Children can certainly feel different temperatures, though, and a thermometer that is marked with drawings (such as the sun, a green plant, and a snowman) can help reinforce what they are discovering about temperatures. Check the "temperature" of different items, habitats, and "micro-environments" (e.g., under forest leaf litter, in full sun on top of a rock, among tree leaves, etc.).

6. Teeny, Tiny Tweezer Trek. Items needed for this activity are small tweezers and small cups (e.g., plastic communion cups). Using only the tweezers and the cups, participants are to go on a mini-collection trek. Only items that can picked up with the tweezers and that fit in the cup may be collected. It's surprising how many items will fit! The purpose of this activity is to improve observation skills (i.e., by looking for a variety of very small things) and to emphasize the need to care about the environment. Indiscriminate collecting can make a big impact on the environment.

7. Natural Textures. Needed for this activity is a collection of materials with different textures (e.g., velvet, velcro, leather, sandpaper, flannel, jello, cork, etc.). The object of this activity is to find things in the natural environment that match the different textures. Examples: Can you find leaves with fuzz like flannel? Can you find bark that is spongy like cork?

8. Sound Catchers. Make sound catchers by cutting out the bottoms of paper cups, yogurt containers, etc. Hold the sound catchers up to your ears. Try focusing on a particular sound, "tuning out" extra noises, etc.

9. Leaf Slides. "Fall leaves are pretty enough to take a picture. Would you like to see my slides?" Pass around "slides" made from pressed leaves framed in cardboard frames.

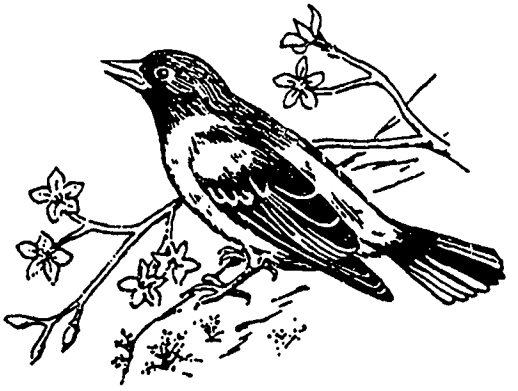
10. How Plants Drink. A discussion on watering plants and talking about plants that are thirsty may raise the question of "Where are their mouths?" The purpose of this activity is to help children discover how plants drink. Placing celery or Queen Ann's Lace in colored water will help children see how water rises through tiny tubes in the plants. Old corn stalks can also be explored for their vascular bundles.

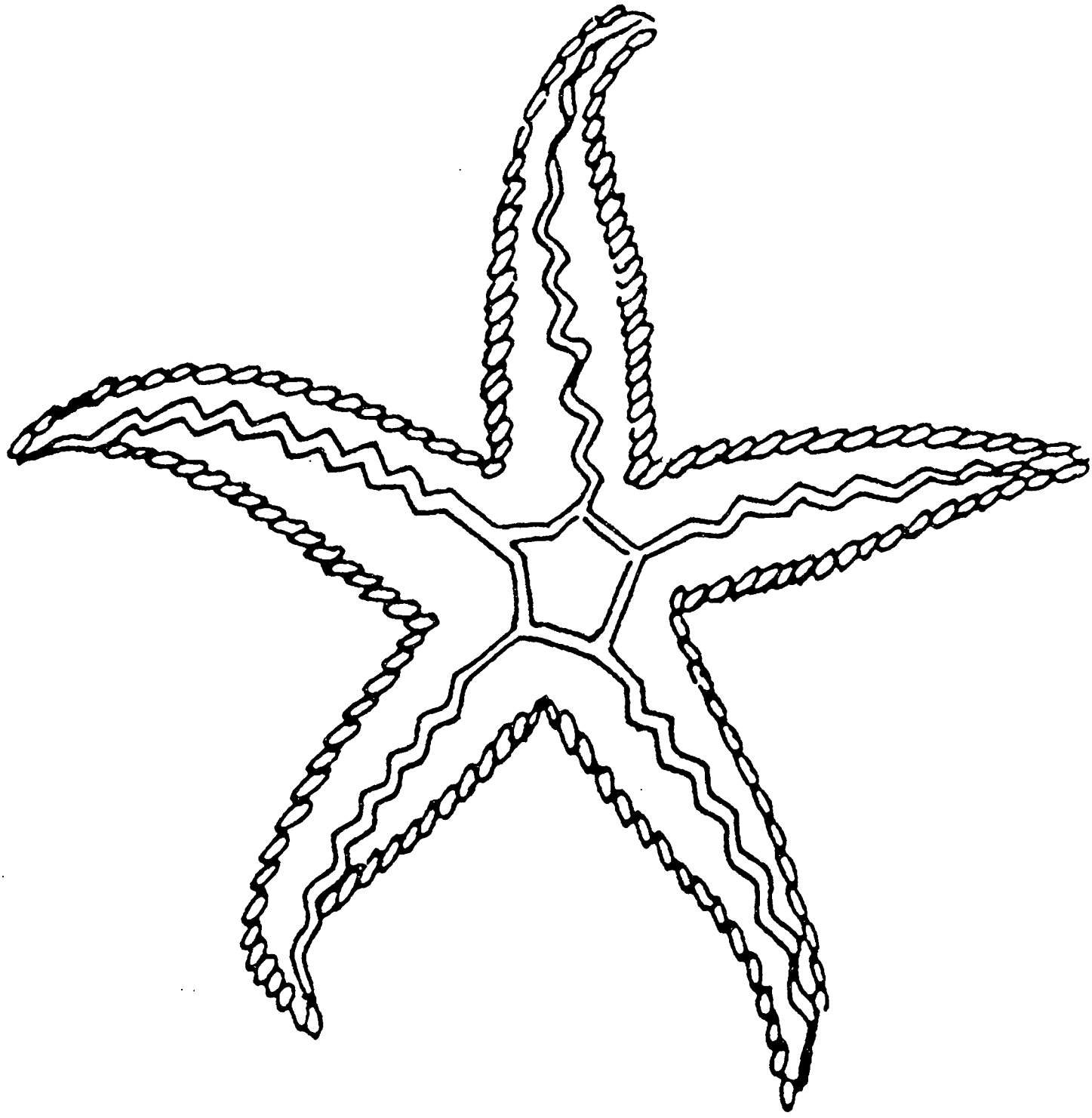
11. "Cameras" or "Viewers." Connect two toilet paper tubes together with paper clips at each end. Use these as "cameras" or "viewers." Encourage using them as "buddy scopes" where what one person spots is shared (through the second tube) with a buddy.

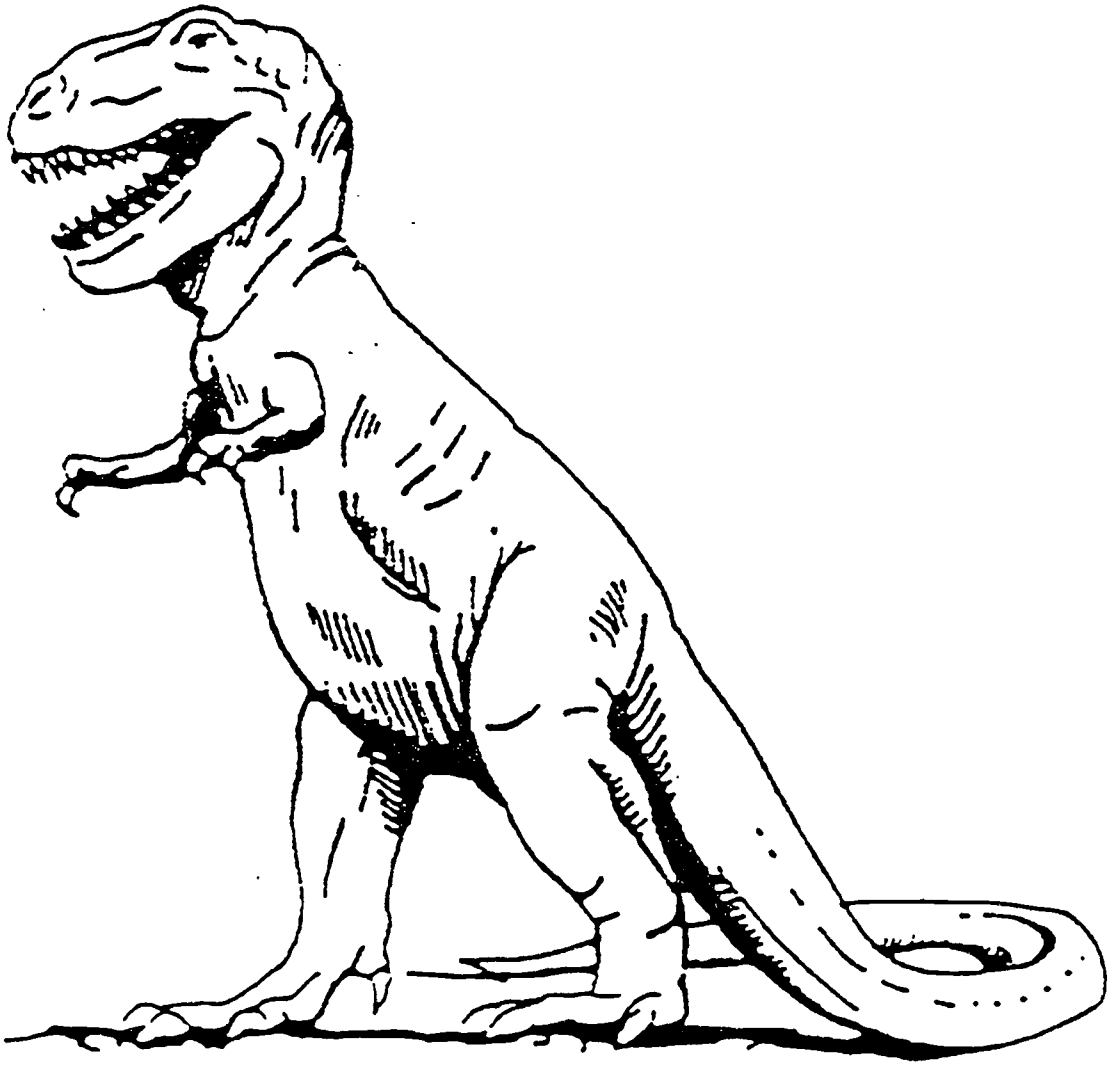
12. Focusing Attention. Use a rounded (stretched) coat hanger to define an outdoor plot or study area. Get down on your hands and knees to explore this area. Can you find five different kinds of plants in your plot? Try to find evidence of an animal in your plot. Does a hand lens help your observation? Are you surprised by the diversity of life in a small plot of "plain old lawn?"

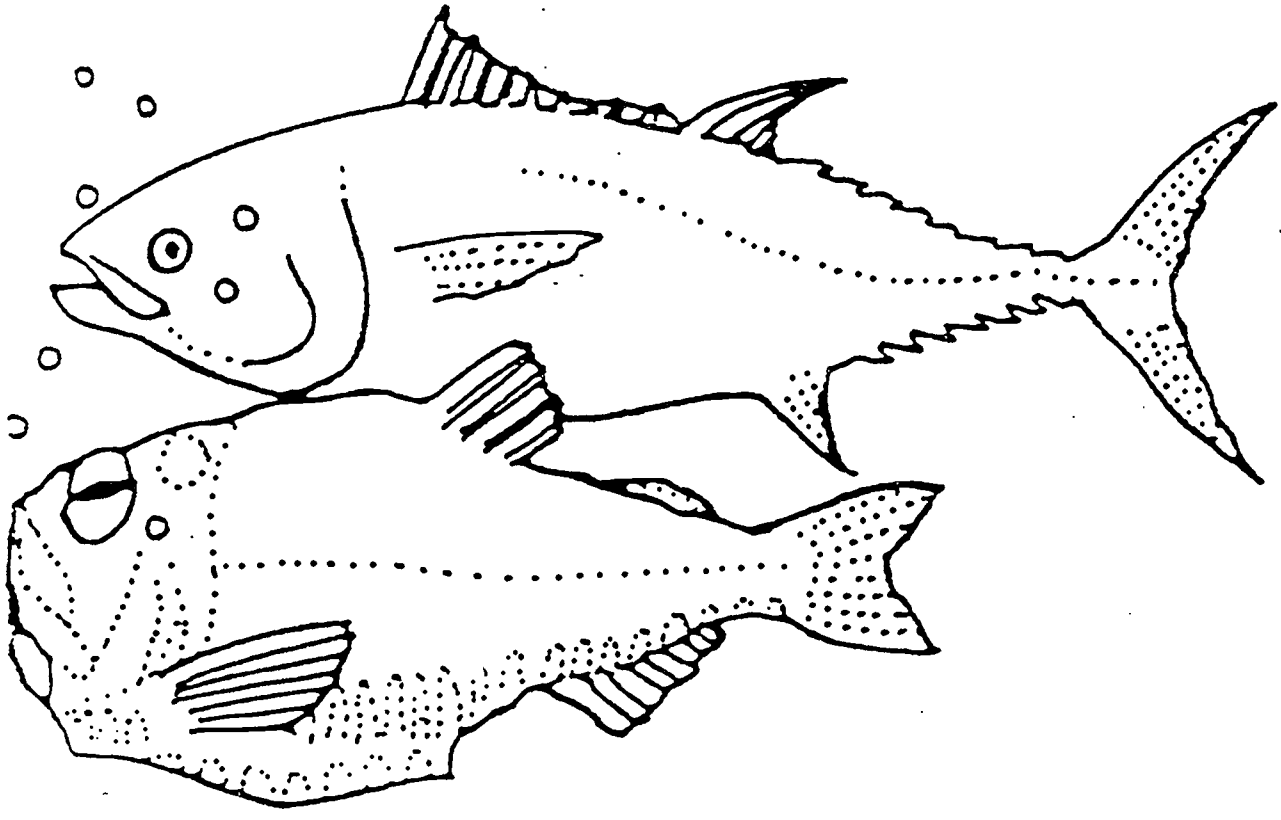
13. Soil From Rocks. Items needed for this activity are construction paper, soft rocks, and a bottle of glue. Use the glue to form a design or write your name on a piece of construction paper. Rub two rocks together over the design. Let the "powder" or "dust" (soil) from the rocks fall on the strips of glue. After the glue dries, blow or shake the excess soil off your paper.

14. Tweety Match. Materials needed for this activity are a large bird chart depicting a variety of birds and a set of cards depicting the same birds. The object of this activity is to match the pictures on the cards to the pictures on the chart.









Animals in the Classroom

Based on the concept of bioregionalism (i.e., the understanding that there are distinct communities, or regions, with mutually supporting life systems that are generally self sustaining), many environmentalists have concluded that the future of the natural environment is dependent on people who know their local environment well. While it is great to study African animals and the rainforest, most people don't know the trees, birds, insects, and rock layers in their own backyards. It's important to know more than just their names. We should also know what they look like or feel like, how they move, what they eat, etc. If we don't know what our local area looks like when it's well, we won't know when things are wrong or missing.

To emphasize how the local region has changed over time, compare two topographical maps of the area—one that is current and one that depicts the area as it was 200 years ago. Note especially the difference in the density of trees. How does this affect other plant and animal life in the area?

Animals in the classroom offer many benefits, including implementation of the "five elements" (discussed previously):

1. Activity

   Doing something: watching, touching, smelling, sometimes hearing, feeding, watering, cleaning, etc.

2. Investigation

   Through discovery learning, children will learn many things about the classroom animal—things an adult won't have to "teach." Students will raise questions that they can discover the answers to: What do the toes feel like? How many worms will it eat in a row?

3. Social Interaction

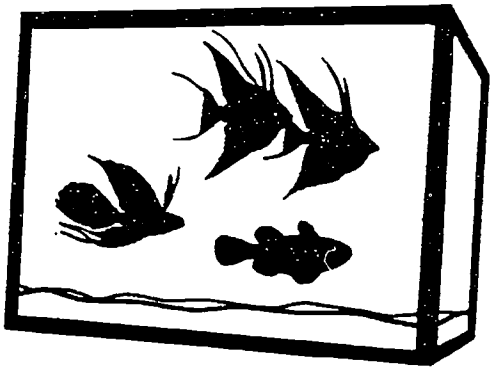
   Animals in the classroom promote student-to-student communication—sharing observations, asking questions, stating hypotheses, etc.

4. Adventure

   Animals in the classroom make hearts beat faster. They set the stage for adventure.

5. Usefulness

Young children tend to find animals useful and relevant to their lives. Their observations and experiences with the animals in the classroom are things they will want to take home to share with their families.



Box Turtle

When it comes to having animals in the classroom, a big issue is fear. Children won't learn and the lesson won't get to the "five elements" as long as fear stands in the way. While some people seem to delight in making kids squirm and squeal in the presence of animals, there is little to indicate that this practice will promote healthy respect and keen curiosity for the other creatures of the earth. A systematic desensitization can be used to deal with fear. This process starts with just being in the presence of an animal, such as a box turtle. Hold the box turtle to show the children that it doesn't bite; nor will it lunge out of your hand and attack the children. Comment on different aspects of the turtle (e.g., its head, back, tail, etc.). Ask the children what they think the turtle will do if you tickle its nose. Then tickle its nose and watch. Tell the children that you'd like to put the turtle on the floor for a very short time (e.g., while you count to three). Ask for the children's permission ("Is it OK to put the turtle on the floor while we count to three?"). After the children become comfortable with the turtle on the floor, give it some food (mealworms).* Have the children watch how it moves and how it eats. Ask the children if anyone would like to touch the turtle? Invite those who want to feel the turtle to touch it with one finger or hold it gently in their hands.

* Source for mealworms:
Grubco Inc.
Box 15001
Hamilton, OH 45015
513/874-5881

Toad

Introduce the toad by explaining that all animals, including the toad, have basically three jobs:

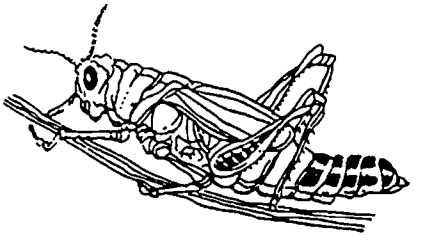
(1) feed (Find Toad Food)
(2) protect themselves (Watch Out for Toad Eaters)
(3) mate (Make Toad Babies)

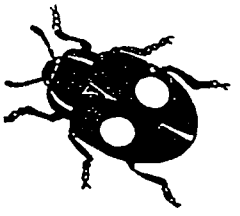
Talking about the three jobs helps children deal with their fear of animals (none of the jobs suggest attacking people). Also discuss how none of their jobs has to do with serving humans. Plants and animals are not on earth to serve us. They do not get up in the morning and ask, "How can I help out humans today?" Their business of the day is to do their three jobs.

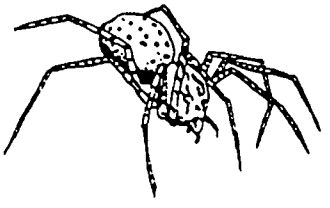
Outdoor Hike to Natural Area

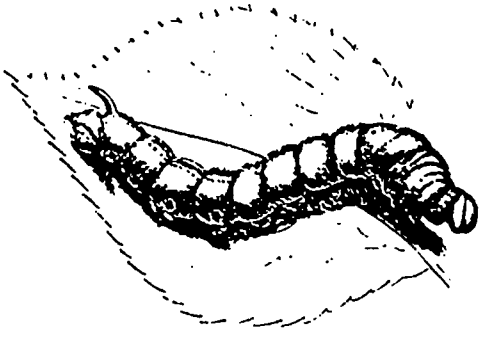
Activities to do during the hike could include:

- a scavenger hunt (on way to the site) (See attached directions for the hunt.)
- looking for specific things, such as spittle bugs, teasel, smooth and staghorn sumac, and spearmint.









A Scavenger Hunt

What can you find on this list? Use all of your senses. Respect life; collect only a little.

GO TO IT

1. **Be a Shirlock or Shirley Holmes**
   Find evidence of:
   - a bird
   - a mammal
   - a thoughtless person

2. **"Hawkeye Hunting" or "The Eyes Have It"**
   - Find a hairy leaf
   - Find something from Canada (think hard -- this may be difficult)
   - Find a tree with different shaped leaves -- collect one of each
   - Find something that will grow
   - Find an object which represents you
   - Find an object older than yourself
   - Write down something that is blue

3. **Touch and Tell**
   - Find something sticky
   - Find a 4-sided plant stem
   - Find something that you would not want to sit on!

4. **Hear Here, Do You Hear What I Hear?**
   - List 5 sounds that could have been heard by the Indians
   - List 5 sounds that would not have been heard by the Indians

5. **Nose and Mouth Stuff - Your Nose Knows**
   - Find something that smells good
   - Find something that smells like a carrot
   - Find something that both you and a bird would like to eat!

6. **Collect Something from a Secret Place**

7. **Put on Your Thinking Cap**
   - Collect exactly 1000 of something
   - Collect more than 1 million of something

8. **For the Young Set**
   - Find a small, soft piece of moss (size of a penny)
   - Find a smooth rock or stone
   - Find a shell
   - Find a leaf that feels like your flannel pajamas

9. **For the "Aware" Person**
   - Find a producer
   - Find a consumer
   - Find a decomposer
   - Find something that is undergoing change
   - Find a unique thing

-- Author Unknown

Day Three

Day Three of the workshop could be designed as a field trip day. Visits to selected EE programs in the community could be arranged. Such programs might include a zoo, nature center, EE-focused classroom, etc. Arrangements for these visits should be made far enough in advance to allow time for meeting with the staff at the host sites to clarify such things as any costs involved, parking concerns, etc. Car pooling arrangements should be made sometime during Day Two of the workshop and maps should be provided. The original workshop at Bowling Green State University included field trips to the Toledo Zoo (Education Department) and the Life Lab at Lourdes College in Sylvania, Ohio. (See Appendix G for sample sections from the Life Lab Curriculum.)

Day Four

Project Learning Tree. Approximately four hours could be devoted to Project Learning Tree (PLT) activities during the fourth day of the workshop. These activities should be conducted by a certified PLT facilitator and should emphasize the prekindergarten component of the PLT program.

PLT represents a hands-on, interdisciplinary environmental education program for students prekindergarten through high school. While the inclusion of PLT in the Natural Beginnings workshop may be limited to a discussion of what PLT has to offer and how to access it, it may be also be included as a "workshop within a workshop." A certified PLT leader should be enlisted to conduct this part of the workshop. Each of the workshop participants would then be eligible to receive a copy of the PLT Activity Guide. Information about PLT and a list of certified leaders are available through the Ohio Department of Natural Resources, Division of Forestry, 1855 Fountain Square Court H-1, Columbus, OH 43224-1327. Phone: 614/265-6605. (Also See Appendix D for a Project Learning Tree Bibliograpy.)

Developing an Environmental Yard. A discussion on how to develop an environmental yard could also be presented on Day Four of the workshop. An actual visit to such a yard would be ideal. One such yard has been developed at the Child Development Center on the campus of Bowling Green State University. Environmental features of this yard include a butterfly garden, bird bath and bird feeders, vegetable and flower gardens, herb garden, wooden boxes for "dens," a combination burrow/hill, an alphabet garden, a vine teepee, a compost pile, and a variety of nature-related manipulatives and art materials (e.g., puzzles, pine cones, shells, seed packets, etc.).

An excellent resource for ideas and information on why and how to develop an environmental yard is the "Habitats for Learning" program. This program includes a motivational video, a how-to guide for using and developing land labs, and a directory of land labs in Ohio. For information on how to access the "Habitats for Learning" materials, contact Diane Cantrell, Division of Soil and Water Conservation, Ohio Department of Natural Resources, 1939 Fountain Square Court E-2, Columbus, OH 43224-1336. Phone: 614/265-6605.

Follow-Up Day

Follow-up Day should be scheduled approxiamtely three to four months after the initial workshop. This schedule should give participants time to develop and fieldtest their EE units and activity boxes.

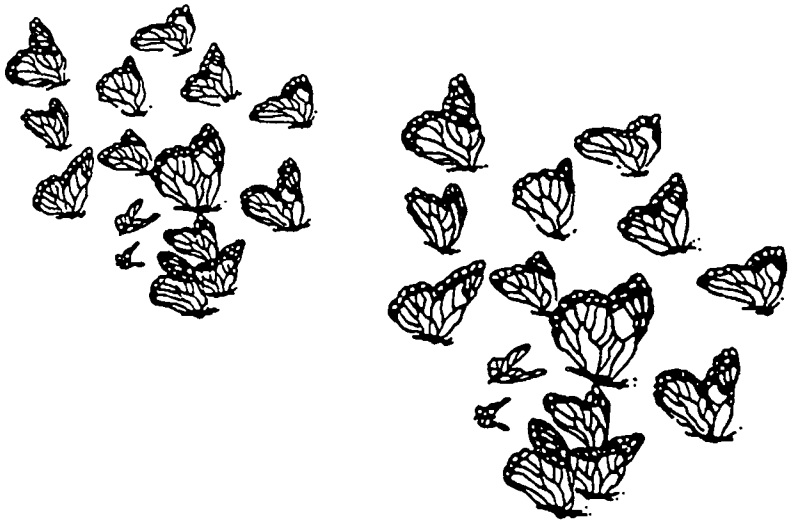
Follow-up Day is planned for two primary purposes: (1) to give workshop participants an opportunity to share the materials and plans they've developed; and (2) to continue the inservice experience. By the scheduled follow-up day, participants will have developed and field tested their environmental education units and activity kits. They will also have had time to begin implementing their "Action Plans," including plans to link with community EE resources. During the follow-up day, participants share successes and stories relating to their products and implementation activities. Such sharing is designed to be motivating and instructive to all involved. It is also designed to provide additional data for evaluating the effectiveness of the workshop. Effectiveness questions addressed during the follow-up day include the following:

- Were participants successful in developing activity kits? To what extent do such kits reflect established criteria?
- To what extent were participants successful in implementing their Action Plans?
- Were participants successful in developing linakges with community EE resources?
- To what extent do teachers feel the workshop helped them grow professionally? personally?

Follow-up day activities might be three hours in length and could be structured around the following schedule:

9:00 - 9:20	Welcome & Overview
9:20 - 10:20	"Show & Tell" of Activity Kits (4 groups)
10:20 - 10:30	Set up Activity Kit Displays
10:30 - 10:45	Review and Evaluate Activity Kits
10:45 - 11:30	Group Discussion* (4 groups)
11:30 - 11:45	Group Reports
11:45 - noon	Wrap-Up and Materials Distribution (i.e., materials individually ordered during the summer workshop)

* See attached "Discussion Topics"



FOLLOW-UP DAY
DISCUSSION TOPICS

1. What's been your most exciting environmental education (EE) experience with the children and how does it relate back to the Natural Beginnings workshop?

2. Looking back on your Natural Beginnings workshop experience, what happened there that helped you grow as a teacher?; that helped you grow as an individual?

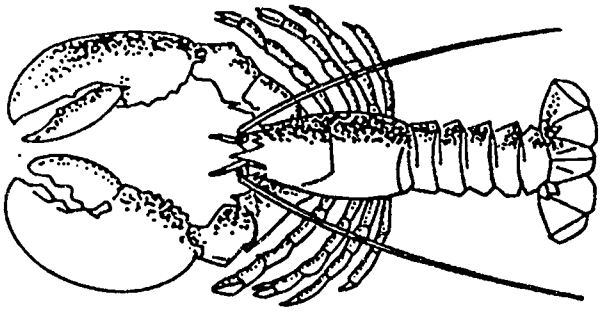
3. What's been the biggest challenge in implementing your environmental education program?

4. Do you have some long range plans for your environmental education program?

5. What kinds of EE activities are you and your students involved in right now?

A Hike Through the Resources

One goal of the workshop is to acquaint teachers with available materials for ECEE. Towards this end, a display of such materials should be provided. Additionally, time should be scheduled sometime during the workshop for teachers to actively explore the materials. Workshop participants could be asked to complete "A Hike Through the Resources" activity sheet while exploring the materials. (See attached.) By the end of the workshop (if the budget allows), participants will choose which materials (up to $40) they'd like to order for their personal library. Order forms that might be used are attached.



NATURAL BEGINNINGS WORKSHOP

HIKE THROUGH THE RESOURCES

You are about to take a hike through a "forest" of resource materials available for teachers of preschoolers. You may want to take the hike alone or with a friend. Whether you travel alone or in pairs, see how many things you can find to use in your early childhood program. Please respond to each of the following with a reference, a short description, or comment.

1. Have you "Hugged a Tree" today? If not, find out how you and a group of young children can "Hug a Tree." Where can you find the activity that tells you how?

   Reference _____

   Page # _____

2. How many different things can children do with leaves in the fall? Find the Leaf Catchers activity in the book, Mudpies to Magnet, for one suggestion. If you think you can use this activity, write the page number here.

3. Find the Project WILD table of contents and read the names of the instructional activities in the guide. Pick one name that sounds interesting and try to guess what the activity might be about. Turn to the page and read the activity. Were you close?!

4. Find two "simple things" that preschoolers "can do to save the earth."

5. Select an insect in Bug Play that you would like to learn more about. Choose an activity you could use to introduce this insect to your students. What insect did you choose?

6. Trails, Tails and Tidepools in Pails promotes the joy of exploring nature and the importance of protecting our wilderness and wildlife areas. Find an activity that you would enjoy sharing with your classroom that introduces both of these concepts.

7. Who says that cooperation is not possible with preschoolers? Find at least one movement activity that encourages cooperation.

8. Young children love to Explore and Experiment. Look in the book by the same title and find at least one activity that you could include in one of your centers or a circle activity.

9. Find a story, finger-play, or poem that you could use in your book center or as part of circle or storytime.

10. Which resource material has a title that fascinates you? Look at the table of contents. Are the titles of the activities fascinating? Look up one activity and see if it matches its title.

11. Children love to create. Select a project from EcoArt which encourages this creativity and promotes an understanding of the importance of recycling.

12. Choose two manipulatives that you could consider using in your classroom. Explain how you might incorporate each one into your classroom activities.

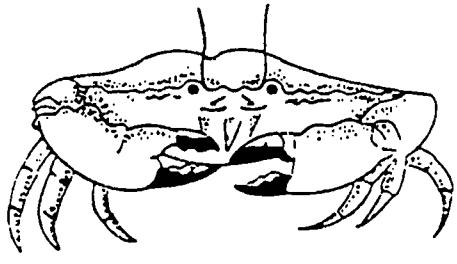
13. Children's books are an essential part of every classroom. Select one of these books that interests you and share a thought concerning its message and appeal to children.

14. Choose a reference book of your choice. Find an activity or idea that you would like to use with young children. Why do you like this activity?

15. Choose a "hands-on" material of your choice. How would you use it with young children? What do you think the children could learn from it?

WELCOME BACK! HOPE YOU HAD A PLEASANT HIKE!!

Adapted from materials developed by
Western Kentucky University



ORDER FORM						
TITLE	CATALOGUE	PAGE	PUBLISHER	ISBN	QTY	PRICE

CATALOGUE:

TITLE	ISBN	PUBLISHER	PAGE	QTY	PRICE

Developing New Materials

One of the criteria for participating in the workshop is the willingness to develop an ECEE instructional unit and an accompanying activity kit. The participants are given a $100 "materials allowance" for the development of the activity kit. The activity kit can take the form of either a "learning center activity box" or a "take-home book bag." An "activity box" focuses on a specific EE concept (e.g., seasons, trees, seeds, pond life, etc.) and includes a guide sheet (outlining topic, objectives, and suggestions for implementation) and hands-on materials (e.g., animal puppets, magnifying glasses, etc.). The purpose of the activity box is to foster the infusion of EE into the early childhood curriculum.

The "book bags" include a children's book with pro-nature themes, a guidesheet for activities relating to the story, and materials needed to implement the suggested activities. The purpose of the book bag is to provide a set of EE materials that a child can take home overnight as a way of involving parents in the EE program.

Participants are required to field test the "activity box" or "book bag" and to share their projects with the larger group during the one-day follow-up session. The "activity boxes" and "book bags" then become the property of the schools or programs in which the participants work. Selected "activity boxes" and "book bags" might be duplicated and added to a centralized EE resource library and displayed at local early childhood conferences.

Following are suggested outlines that might be used for developing the ECEE unit, the take-home book bag, and the learning center activity box. Criteria, checklists, and a Rating Form for reviewing these materials are also provided. Information gathered from the completed Rating Forms can be used to determine which activity kits might be duplicated for wider distribution.

Another way to make all the ECEE units available to a larger group of teachers is to collect and duplicate the print materials developed by the workshop participants. The entire packet could then be distributed to all the workshop participants and made available through a lending library of resource materials.

OUTLINE
EARLY CHILDHOOD ENVIRONMENTAL EDUCATION UNIT

Theme:
Learning Objectives:
Overview/Background Information:
Group Activities:

Indoors
#1

#2

#3

Outdoors
#1

#2

#3

Learning Center Materials/Activities:

Books/Literacy
Dramatic Play
Art
Music
Creative Movement
Science/Discovery
Cooking/Snacks

Variations:

Extensions/Enrichment:

Parent Involvement:

Evaluation Procedures:

Related References:

Developed By:

OUTLINE
NATURAL BEGINNINGS ACTIVITY BOX

Title: _____

Topic/Theme: _____

Objectives: _____

_____

_____

Materials: _____

_____

_____

_____

Directions/Suggestions: _____

_____

_____

Suggested Community Resources: _____

_____

_____

Other References & Resources: _____

_____

_____

Developed by: _____

OUTLINE
NATURAL BEGINNINGS BOOK BAG

Book Title:

Activity #1
- Title:
- Objective(s):
- Materials:
- Directions/Suggestions:

Activity #2
- Title:
- Objective(s):
- Materials:
- Directions/Suggestions:

Activity #3
- Title:
- Objective(s):
- Materials:
- Directions/Suggestions:

Suggested Community Resources: _____

_____

_____

Other References & Resources: _____

_____

_____

Developed by: _____

Checklist for Developing Activity Kits

1. Are the learning objectives clearly stated?
2. Are the directions or suggestions clear?
3. Are the materials attractive and appealing to teachers and young children?
4. Are suggestions for additional resources provided?
5. Do the materials and activities invite child exploration and discovery?
6. Do the materials and activities allow for participation by children of varying abilities?

Activity Kits/Book Bags
REVIEW*

Number (#)	Reviewed		Rating			Comments
1	Y	N	L	M	H	
2	Y	N	L	M	H	
3	Y	N	L	M	H	
4	Y	N	L	M	H	
5	Y	N	L	M	H	
6	Y	N	L	M	H	
7	Y	N	L	M	H	
8	Y	N	L	M	H	
9	Y	N	L	M	H	
10	Y	N	L	M	H	
11	Y	N	L	M	H	
12	Y	N	L	M	H	
13	Y	N	L	M	H	

Number (#)	Reviewed		Rating			Comments
14	Y	N	L	M	H	
15	Y	N	L	M	H	
16	Y	N	L	M	H	
17	Y	N	L	M	H	
18	Y	N	L	M	H	
19	Y	N	L	M	H	
20	Y	N	L	M	H	
21	Y	N	L	M	H	
22	Y	N	L	M	H	
23	Y	N	L	M	H	
24	Y	N	L	M	H	
25	Y	N	L	M	H	

* Code: # = number assigned to kit
Y = yes; N = no
L = low; M = medium; H = high

Partnership Plans

The establishment of on-going relationships with community EE resource professionals is one of the desired outcomes of the Natural Beginnings workshop. Becoming aware of EE resource professionals in the community is an important first step towards fostering the development or partnership plans. To foster this awareness, community EE resource professionals are invited to become a part of the workshop by presenting information about their programs, hosting field trips to their sites, and discussing partnership ideas with the workshop participants. (See attached letter to community EE resource personnel involving their participation in the workshop and a response form for their reply.)

Workshop participants are expected to have some aspects of a partnership plan developed before the end of the workshop. They will then be asked to report on the status or progress of their plans at the scheduled follow-up session. (See attached outline that might be used for recording or describing the partnership action plans.)

As a way to collect impact data from this aspect of the workshop, pre and post inventories relating to current linkages with community EE resources might be administered. Copies of these inventories are attached.

INVITATION TO COMMUNITY EE RESOURCE PERSONNEL

Sample Letter to Community EE Resource Personnel

Enclosed is some information about an early childhood environmental education (EE) workshop to be offered at (site) during the week of (dates). Establishing partnerships with community environmental education resource personnel is considered an important part of this workshop. To facilitate linkages with such resources, we would like to invite you to join us for an interactive session with the workshop participants on (date and time). During this time, we would be interested in receiving information about the kinds of programs you offer for young children and their families. We would also be interested in your ideas on how preschool teachers might establish on-going linkages with community environmental education resources to strengthen their EE curriculum.

If you are interested in sharing information about your program, please complete and return the attached Response Form. If you have questions or comments, please contact (name and phone number).

Natural Beginnings Workshop
EE Community Resources

Response Form

_____ Yes, I am interested in sharing information about community environmental education resources available through our program and will plan to participate in an interactive session with workshop participants at (place and time).

_____ Yes, I am interested in sharing information about community environmental education resources available through our program but cannot participate in the interactive session. Attached is some print information to share.

Name _____

Agency _____

Address _____

_____

Phone _____

Comments:

Please return to (name, address).

Partnership Action Plan

Partners involved:

Name, address, phone, title of agency (for each partner)

Proposed activities and timeline:

Evaluation plan:

Name: _____ Date: _____

Survey of
Community Environmental Education Resources

Resource Used (field trip, speaker, etc.)	How Used

What other community EE resources are you aware of but have not used?

Meeting Expectations and Needs

The initial survey (Survey I) sent to the applicants chosen to participate in the workshop included items asking individuals why they wanted to attend and what they hoped to gain through the workshop. Respnses to this survey should be analyzed carefully prior to the beginning of the workshop. A summary of the responses should be shared with each of the presenters and, as much as possible, efforts to address the applicants' expectations and needs should be made.

Some of the reasons for wanting to participate in the workshop cited by the initial group of participants (Bowling Green State University, 1995) are outlined below. It is anticipated that other groups may express similar reasons.

- Want to share ideas about early childhood environmental education (EE) with colleagues (including offering inservice workshops or conference presentations)
- Desire to expand own knowledge base about the environment and about EE
- Opportunity to be with other professionals with same belief and to collaborate with them in EE initiatives
- Increase knowledge of EE resources, activities, and ideas (including ideas on how to implement an EE curriculum in the classroom and oudoors)
- Learn how to develop an understanding and appreciation of nature in young children
- Learn how to make EE (science and nature) a larger part of the curriculum and how to help children learn about the importance of taking care of the earth
- Rekindle own desire to share nature with children
- Want to share EE ideas with parents
- Make better use of community EE resources

Resources and/or supports that applicants indicated they would find most helpful include:

- books (i.e., age-appropriate EE literature)
- materials (such as simply-written information with pictures, sources for music, materials that would be available on a rotating basis to provide variety, videos, and tapes)
- further inservcice opportunities (e.g., lectures and workshops)
- list of resources (possible EE guests, field trip possibilities, etc.) and information on how to access them
- an outdoor area/playground more geared towards exploration of the natural environment
- information coming on a regular basis (e.g., newsletter)
- information on sources for grants
- program visits
- hands-on projects

- equipment for exploration (magnifying glasses, specimen bottles, hatcheries)
- organized file to pull resources from
- live animals

In response to what they were hoping to gain or to experience from the workshop, applicants noted the following:

- better knowledge of EE (e.g., what topics are appropriate for preschoolers; how to develop an EE educational unit)
- information on how to communicate EE ideas to parents
- knowledge of resources in EE
- more skills in teaching EE
- information and materials to take back to staff
- enhanced quality of program
- confidence in EE
- hands-on opportunities
- increased personal sensitivity and awareness ("recharge my love for nature")
- interaction between participants (networking; ideas from other teachers)
- ideas on how to use natural items (pinecones, leaves, etc.) for EE
- ideas for long-term projects
- ideas and methods for presenting EE to children with disabilities
- ways to take advantage of every opportunity to enjoy nature
- practical ways to include the environment in daily school life
- ideas on helping staff learn about nature
- information about inside vegetation and plant growth

Feedback and Suggestions from Participants

After the initial four-day workshop at BowlingGreen State University, participants were asked to comment on parts of the workshop that were most meaningful or helpful to them and to make suggestions on how the workshop might be improved in the future. Following are some of the suggestions and ideas taken from their responses to items on Survey II. This feedback might be helpful in planning future workshops.

To the question of what parts were most meaningful or helpful, responses included:

- experiencing nature ourselves
- field trips (to the zoo and a life lab classroom)
- information about and the visit to the environmental yard
- Project Learning Tree
- contacts with others and the sense of support gained from this
- useful information and ideas
- contact with resources (written and people)
- exploring the available resource materials

- ideas on concrete ways to infuse EE in the curriculum
- demonstration on how to use puppets
- exposure to real animals (toad, turtle, snails, etc.) and ideas on how to use them in the classroom

Following are some suggestions that were offered on how to improve the workshop:

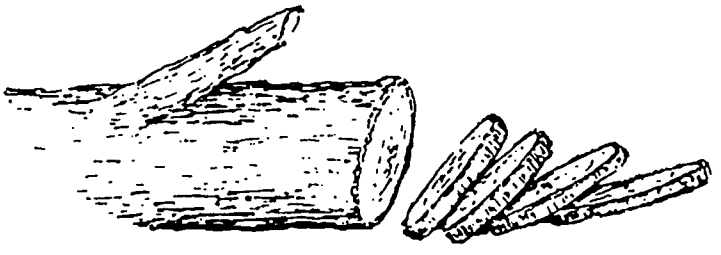
- more hands-on activites; less sitting and listening
- hold the workshop in a more natural setting
- schedule a larger meeting room
- enlist a speaker to provide some songs and movement activities
- shorter period each day, but add a day
- more unstructured time for sharing
- ideas for parent involvement and parent/child activities
- list of local stores/suppliers of materials relevant to EE for preschool
- schedule 15-20 minutes each day for reviewing materials and asking questions
- take a yard and show how to use that space as a learning environment, at low cost
- include a walk at a park and hold the workshop there one day
- more time on animals in the classroom

Name Tags and Getting to Know Each Other

As many of the participants may not know each other, name tags should be used. As an alternative to using contact paper name tags which need to be replaced each day of the workshop, different types of materials might be considered. One idea is to make name tags out of wood. This can be done by cutting a branch vertically into thin (approximately one-fourth inch) pieces. Each piece will be in the form of a small circle. After the circles are cut, a hole is drilled near the edge of the circle and a piece of ribbon or yarn threaded through the hole. By tieing the two ends of the ribbon together and using a wide felt tip marker to write names on the wooden circles, more permanent and interesting name tags can be made. If getting the circles cut from a branch presents a problem, wooden cut-outs (usually found at craft stores) can be used instead. These wooden cut-outs come in a variety of shapes (many relating to nature, such as animal shapes) and are usually made from soft wood, which is easy to work with in making a hole to thread the ribbon.

As an ice breaker, participants might be invited to add a nature-related symbol to their name tag. To do this, they are asked to think of something in nature that reflects something about themselves and then to draw that item on their name tag. After everyone's drawing is complete, participants are asked to partner with someone they do not already know and talk about the symbol they each drew. The next step is for each person to introduce their partner to the group with a brief explanation of why their partner chose their individual symbol.

Also, as a way to get to know each other and to stay in touch, a list of workshop participants with addresses and phone numbers could be compiled. Where each participant works might also be included. This list could then be provided to each of the participants, along with a list and contact information for each of the presenters.



Workshop Assistant

In addition to having a coordinator responsible for all aspects of the workshop, a facilitator or workshop assistant may also be designated. This individual would assist the coordinator in managing some of the details involved in the implementation of the project. Following is a suggested job description for a workshop assistant.

Workshop Assistant
Job Description

Before

Brainstorm/review workshop plans
Communicate with participants & presenters
- Confirm attendance
- Check completion of pretest
- Confirm presenters/site visits

Order lunches & refreshments
Prepare handout materials
Arrange audiovisual equipment
Respond to inquiries

During

Daily set up
Trouble shoot
Take orders for materials

After

Order materials
Check completion of posttest
Respond to inquiries

Luncheon Activities

If the workshop budget allows for the provision of lunches, some consideration towards making these lunches a part of the learning experience might be considered. For example, the lunches might be planned around certain ecological understandings or principles--i.e., the need for recycling, the sources of food, the wonder of the natural world, etc. Following are several suggested activities:

1. Avoid the use of disposable tableware. Identify ways to simplify this process (e.g., how best to wash and store the dishes).

2. Identify ways to reuse or recycle packaging used for the lunches.

3. Make a piece of raw fruit (apple, orange, pear) a part of the lunch. Cut the fruit into sections. Have each participant first eat one section of their own piece of fruit, attending closely to the texture and taste. Then have each participant exchange a section of their fruit (of the same kind) with another participant. Note differences in the texture and taste.

If the workshop budget does not allow for funding of the lunches, you may wish to write a small companion grant proposal, perhaps targeting a community resource for possible funding. (See Appendix E for an example of a proposal that might be used.)

If funding cannot be obtained for the lunches, you may wish to invite the participants to bring a brown bag lunch. Coolers could be provided for the cold foods. Coffee, tea, ice tea, and ice water could also be provided. To conserve on throw-away cups, participants could be invited to bring their own mug.

Timeline for Participants' Responsibilities

Because participants have a number of different responsibilities to complete before, during, and after the four-day workshop, it may be helpful to give them an outline of tasks and due dates for the accomplishment of these responsibilities. Following is an outline that might be used as a sample to work from. Due dates are not provided as these are entirely contingent on the dates of the workshop.

Participant Activities/Responsibilities	**Due Date**
Complete pretest survey	
Complete posttest survey	
Develop Implementation Plan	
Develop thematic unit	
Develop and fieldtest activity kit or book bag	
Share information about unit and activity kits	
Share information about status of Implementation Plan	
Complete follow-up survey	

Evaluation

Evaluation should be an important of the workshop plan. Evaluation of this workshop centers primarily around three different participant surveys. The first survey (Survey I) is designed to serve as a pre-test of participants' attitudes, knowledge, and current practices relating to early childhood environmental education (ECEE). This survey is administered prior to the workshop. The second survey (Survey II) is administered at the end of Day Four of the workshop to collect immediate feedback from the participants regarding the quality of the workshop and the value of the experience for them in planning to make EE a part of their curriculum. A third survey (Survey III) is administered six to eight months after the workshop to ascertain participants' perceived success in carrying out their Implementation Plans and making EE an integral part of their curriculum. Each of the surveys include items addressing knowledge, attitudes, and current practices related to the implementation of an ECEE program, including items addressing linkages with community EE resource professionals, awareness of available ECEE resources, parent involvement in EE activities, and nature-related activities and materials used in the classroom and outdoor play space. Following are copies of each of the surveys.

Implementation plans can also be used to help evaluate the success of the workshop. Workshop participants might be asked to complete an "Implementation Plan" (see attached form) sometime during Day Four of the workshop or within a week or two after the workshop. Progress toward implementing their plans can then be discussed during the Follow-up Day several months after the workshop. The teachers' success in developing and implementing their plans can be used as one indicator of workshop effectiveness.

EVALUATION FORMS

Natural Beginnings
Survey I

To what extent do each of the following statements (1-10) match your current feelings and/or thoughts?

Please circle your response. (1 = not at all 5 = very much)

1.	I feel that I have a clear understanding of the rationale for environmental education at the early childhood level.	1	2	3	4	5
2.	I feel comfortable in knowing how to infuse environmental education into an early childhood program.	1	2	3	4	5
3.	I am aware of many materials available for environmental education at the early childhood level.	1	2	3	4	5
4.	I feel comfortable in knowing how to develop an environmental education unit for young children.	1	2	3	4	5
5.	I feel comfortable with my own level of understanding and appreciation of the natural world.	1	2	3	4	5
6.	I am aware of at least several environmental education resource professionals and/or programs in the community that I could use to help me in providing environmental education at the early childhood level.	1	2	3	4	5
7.	Infusing environmental education into my program is a high priority for me.	1	2	3	4	5
8.	I feel comfortable in knowing how to make an outdoor play area more nature-focused.	1	2	3	4	5
9.	I feel comfortable in knowing how to make our program more environmentally responsible.	1	2	3	4	5
10.	Environmental education is currently a very important part of my program.	1	2	3	4	5

11. How many environmental education workshops have you previously attended?
_____ none _____ one to three _____ four to six _____ more than six
Who sponsored these workshops?

12. About how often do you currently implement environmental education activities in your classroom or program?

_____ never _____ one-two days per week _____ three-five days per week

_____ once every two weeks _____ once a month _____ less than once a month

13. Do you currently involve children in recycling? _____ yes _____ no
If yes, which of the following do you recycle on a regular basis?

_____ cans _____ paper _____ plastic containers _____ other _____

14. At the current time, how many of the following do you have in your classroom? (Enter #)

_____ displays of realistic animals _____ realistic puppets of animals

_____ puzzles/games featuring realistic animals and/or plants

_____ living plants

_____ living animals (which? _____)

_____ manipulative materials from the natural environment (e.g., shells, nuts, leaves, stones, etc.)

_____ children's books (fiction or non-fiction) focusing on realistic depictions of the natural world

_____ other nature-related items (which? _____)

_____ other nature-related items(which? _____)

15. At the current time, which of the following are a part of your outdoor learning area or are used for outdoor activities? (Check all that apply.)

_____ flower garden(s) _____ vegetable garden(s) _____ herb garden(s)

_____ bird feeder _____ bird house _____ bird bath

_____ dirt-digging area _____ tree house _____ rock pile

_____ magnifying glasses _____ windsock _____ compost

_____ other nature-focused features/materials in your outdoor area:

16. Approximately how many nature-focused field trips do you take each year?

Cite locations visited (park, farm, pond, nature center, etc.):

17. Have you involved any environmental education professionals (e.g., naturalists) in your program within the last year? ___ yes ___no. If yes, who and in what way?

18. How would you describe your present level of environmental sensitivity and/or concern?

____ very low ____ low ____ moderate ____ fairly high ____ high

19. If you feel that your are an environmentally sensitive individual, to what extent do you think one or more of the following have contributed to this?
(1 = no/very small influence; 2 = moderate infludence; 3 = great influence)

mother	____ 1	____ 2	____ 3
father	____ 1	____ 2	____ 3
sibling	____ 1	____ 2	____ 3
teacher(s)	____ 1	____ 2	____ 3
friend(s)	____ 1	____ 2	____ 3
personal experiences with nature	____ 1	____ 2	____ 3
scout leader	____ 1	____ 2	____ 3
professional associate(s)	____ 1	____ 2	____ 3
author/book	____ 1	____ 2	____ 3
other (specify)			
_____	____ 1	____ 2	____ 3
_____	____ 1	____ 2	____ 3

20. What kinds of resources or supports would you find most helpful for improving your environmental education program?

Natural Beginnings
Survey II

To what extent do each of the following statements (1-12) match your current feelings and/or thoughts?

Please circle your response. (1 = not at all 5 = very much)

1.	I feel that I have a clear understanding of the rationale for environmental education at the early childhood level.	1	2	3	4	5
2.	I feel comfortable in knowing how to infuse environmental education into an early childhood program.	1	2	3	4	5
3.	I am aware of many materials available for environmental education at the early childhood level.	1	2	3	4	5
4.	I feel comfortable in knowing how to develop an environmental education unit for young children.	1	2	3	4	5
5.	I feel comfortable with my own level of understanding and appreciation of the natural world.	1	2	3	4	5
6.	I am aware of at least several environmental education resource professionals and/or programs in the community that I could use to help to me in providing environmental education at the early childhood level.	1	2	3	4	5
7.	Infusing environmental education into my program is a high priority for me.	1	2	3	4	5
8.	I feel comfortable in knowing how to make an outdoor play area more nature-focused.	1	2	3	4	5
9.	I feel comfortable in knowing how to make our program more environmentally responsible.	1	2	3	4	5

10.	To what extent has the Natural Beginnings workshop helped you to be more environmentally aware or sensitive?	1	2	3	4	5
11.	To what extent has the Natural Beginnings workshop helped you gain new ideas and information on how to infuse environmental education into your early childhood program?	1	2	3	4	5
12.	To what extent has the Natural Beginnings workshop motivated you to make environmental education an integral part of your early childhood program?	1	2	3	4	5

Comments on the usefulness or value of the Natural Beginnings workshop:

Suggestions for improving the Natural Beginnings workshop:

Natural Beginnings
Survey III

To what extent do each of the following statements (1 - 11) match your current feelings and/or thoughts?

Please circle your response. (1 = not at all 5 = very much)

1.	I feel that I have a clear understanding of the rationale for environmental education at the early childhood level.	1	2	3	4	5
2.	I feel comfortable in knowing how to infuse environmental education into an early childhood program.	1	2	3	4	5
3.	I am aware of many materials available for environmental education at the early childhood level.	1	2	3	4	5
4.	I feel comfortable in knowing how to develop an environmental education unit for young children.	1	2	3	4	5
5.	I feel comfortable with my own level of understanding and appreciation of the natural world.	1	2	3	4	5
6.	I am aware of at least several environmental education resource professionals and/or programs in the community that I could use to help to me in providing environmental education at the early childhood level.	1	2	3	4	5
7.	Infusing environmental education into my program is a high priority for me.	1	2	3	4	5
8.	I feel comfortable in knowing how to make an outdoor play area more nature-focused.	1	2	3	4	5
9.	I feel comfortable in knowing how to make our program more environmentally responsible.	1	2	3	4	5

10. Environmental education is currently a very important part of my program. 1 2 3 4 5

11. I feel I've been effective in helping colleagues and/or parents foster an appreciation of nature in young children. 1 2 3 4 5

12. About how often do you currently implement environmental education activities in your classroom or program?

_____ never _____ one-two days per week _____ three-five days per week

_____ once every two weeks _____ once a month _____ less than once a month

13. Do you currently involve children in recycling? _____ yes _____ no
If yes, which of the following do you recycle on a regular basis?

_____ cans _____ paper _____ plastic containers _____ other _____

14. At the current time, how many of the following do you have in your classroom? (Enter #)

_____ displays of realistic animals _____ realistic puppets of animals

_____ puzzles/games featuring realistic animals and/or plants

_____ living plants.

_____ living animals (which?_____)

_____ manipulative materials from the natural environment (e.g., shells, nuts, leaves, stones, etc.)

_____ children's books (fiction or non-fiction) focusing on realistic depictions of the natural world

_____ other nature-related items (which? _____)

_____ other nature-related items(which? _____)

15. At the current time, which of the following are a part of your outdoor learning area or are used for outdoor activities? (Check all that apply.)

_____ flower garden(s)	_____ vegetable garden(s)	_____ herb garden(s)
_____ bird feeder	_____ bird house	_____ bird bath
_____ dirt-digging area	_____ tree house	_____ rock pile
_____ magnifying glasses	_____ windsock	_____ compost

_____ other nature-focused features/materials in your outdoor area:

16. Approximately how many nature-focused field trips did you take in the last two months?

Cite locations visited (park, farm, pond, nature center, etc.):

17. Have you involved any environmental education professionals (e.g., naturalists) in your program within the last two months? ___ yes ___no. If yes, who and in what way?

18. How would you describe your present level of environmental sensitivity and/or concern?

____ very low ____ low ____ moderate ____ fairly high ____ high

19. Have you involved parents in any environmental education activities within the last three months? ___ yes ___no. If yes, in what ways?

20. What kinds of resources or supports would you find most helpful for improving your environmental education program?

21. Additional comments about your environmental education program at the present time:

Natural Beginnings Implementation Plan

Briefly describe your environmental education (EE) implementation plans in each of the following areas. Please include tentative completion dates for planned activities.

Partnership with community EE professionals/programs:

Curriculum:

Sharing with colleagues and parents:

Other:

Name _____ Date _____

REFERENCES

Carson, R. (1984). The sense of wonder. New York: Harper & Row.

Iozzi, L. A. (1989). Environmental education and the affective domain. Journal of Environmental Education, 20(4), 6-13.

Rockwood, R. E., Sherwood, E. A., & Williams, R. A. (1986). Hug a tree and other things to do outdoors with young children. Mt. Rainer, MD: Gryphon House.

Stone, J. (1989). Preparing teachers to become involved as environmental educators. Contemporary Education, 60(3), 159-162.

Wilson, R. A. (1993). Fostering a sense of wonder during the early childhood years. Columbus, OH: Greyden Press. (Also available through the Ohio Environmental Education Fund, Ohio EPA, P.O. Box 1049, Columbus, OH 43216-1049. Phone: 614/644-2873.)

Zetlin, P., & Berman. (1974). Spin, Spider, Spin (record album). Freeport, NY: Educational Activities, Inc.

ADDITIONAL RESOURCES

Print Materials

Braus, J. A., & Wood, D. (1993). Environmental education in the schools. Washington, DC: Peace Corps Information Collection & Exchange.

Cantrell, D. C., & Barron, P. A. (Eds.). (1994). Integrating environmental education and science. Newark, OH: Environmental Education Council of Ohio.

Chase, J. (1995). Blueprint for a green school. New York: Scholastic.

Cohen, S., & Horm-Wingerd, D. (1993). Ecological awareness among preschool children. Environment and Behavior, 25(1), 103-120.

Cohen, S., & Troestle, S. (1990). This land is our land: Promoting ecological awareness in young children. Childhood Education, 66, 304-310.

Dighe, J. (1993). Children and the earth. Young Children, 48(3), 58-63.

Elliot, S., & Emmett, S. (1991). Snails live in houses too. Cammeray, Australia: Horwitz Grahame Pty. Ltd.

Furman, E. (1990, November). Plant a potato--Learn about life (and death). Young Children, pp. 15-20.

Galvin, E. S. (1994). The joy of seasons: With the children, discover the joys of nature. Young Children, 40(4), 4-9.

Haiman, P. E. (1991). Developing a sense of wonder in young children. Young Children, 46(6), 52-53.

Harlan, J. D. (1992). Science experiences for the early childhood years. New York: Macmillan Publishing Company.

Heald, C. L., & Piltzecker, J. W. (1995). Building bridges between teachers and resources. Legacy, 6(4), 16-19.

Holt, B. G. (1989). Science with young children. Washington, DC: NAEYC.

Klein, A. (1991). All about ants: Discovery learning in the primary grades. Young Children, 46(5), 23-27.

Moore, R. (1989). Plants as play props. Children's Environments Quarterly, 6(1), 3-7.

Rejeski, D. W. (1982). Children look at nature: Environmental perception and education. Journal of Environmental Education, 13(4), 27-40.

Roger Tory Peterson Institute of Natural History. (1991). Bridging early childhood and nature education. Jamestown, NY.

Sebba, R. (1991). The landscapes of childhood: The reflection of childhood's environment in adult memories and in children's attitudes. Environment and Behavior, 23(4), 395-422.

Sunal, D. W., & Sunal, C. S. (1990, Fall). Helping young children appreciate beauty in natural areas. Day Care and Early Education, pp. 26-29.

Wilke, R. J. (Ed.). (1993). Environmental education teacher resource handbook. Millwood, NY: Kraus International Publications.

Wilson, R. A. (1991). Alternatives to the big bad wolf. Journal of the Ohio Elementary Kindergarten Nursery Educators, 11, 15-17.

Wilson, R. A. (1993). Educators for earth: A guide for early childhood instructors. Journal of Environmental Education, 24(2), 15-21.

Wilson, R. A. (1994). Enhancing the outdoor learning environments of preschool programs. Environmental Education, 46, 26-27.

Wilson, R. A. (Ed.). (1994). Environmental education at the early childhood level. Washington, DC: North American Association for Environmental Education.

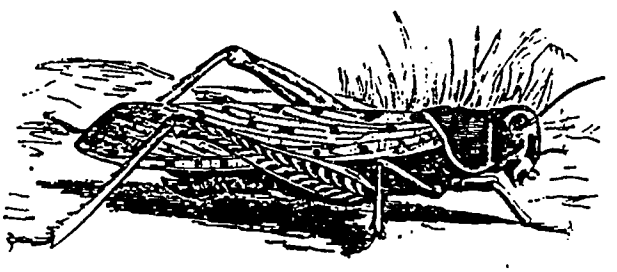
Wilson, R. A. (1993). Fostering a sense of wonder during the early childhood years. Columbus, OH: Gryeden Press.

Wilson, R. A. (1995). Let nature be your teacher. Day Care and Early Education, 22(3).

Wilson, R. A. (1995). Nature and young children: A natural connection. Young Children, 50(6), 4-11.

Wilson, R. A. (1993). Nature education and science. Day Care and Early Education, 20(4), 15-17.

Wilson, R. A. (1993). The importance of environmental education at the early childhood level. Environmental Education and Information, 12(1), 15-24.



Programs and Activities

National Consortium for Environmental Education & Training (NCEET)
School of Natural Resources & Environment
The University of Michigan
Ann Arbor, MI 48109

Roger Tory Peterson Institute of Natural History
110 Marvin Parkway
Jamestown, NY 14701

SYEFEST (Schoolyard Ecology for Elementary School Teachers)
Institute of Ecosystem Studies
Box R (Route 44A)
Millbrook, NY 12545-0178

Habitats for Learning provides a directory and planning guide to help use any setting as a land lab.

Contact: Dr. Diane C. Cantrell
Division of Soil and Water Conservation
Ohio Department of Natural Resources
Environmental Education Section
1939 Fountain Square Court E-2
Columbus, OH 43224

ALL OF THE FOLLOWING ARE INTERDISCIPLINARY AND AVAILABLE TO EDUCATORS THROUGH WORKSHOPS:

Project Learning Tree uses the forest as a "window" into the natural world.

Contact: Bill Schultz
Division of Forestry
Ohio Department of Natural Resources
1855 Fountain Square Court H-1
Columbus, OH 43224-1327

Project Wild develops problem-solving and decision-making skills in determining responsible human actions toward wildlife and the environment.

Contact: Paul Schiff
Division of Wildlife
Ohio Department of Natural Resources
1840 Belcher Drive G-1
Columbus, OH 43224-1329

Portapark activities focus on plant life, animal life, park environment, and litter awareness.

Contact: Ron Mills
Division of Parks and Recreation
Ohio Department of Natural Resources
1952 Belcher Drive C-3
Columbus, OH 43224-1386

Super Saver Investigators focuses on solid waste issues, recycling, natural resources, and environmental protection.

Contact: Dave Landis
Division of Litter Prevention and Recycling
Ohio Department of Natural Resources
1889 Fountain Square Court F-1
Columbus, OH 43224-1331

Project Wet is a collection of water-related activities which stress the properties of water, quantity and quality issues, aquatic wildlife, ecosystems and management strategies.

Contact: OWEP Program Manager
c/o Water Management Association of Ohio
262 Agricultural Engineering
590 Woody Hayes Drive
Columbus, OH 43210-1057

Storytelling Resources

Also see Appendix F for ideas on storytelling.

Bauer, Caroline Feller. New Handbook for Storytellers. Chicago: American Library Association, 1993. ISBN 0-8389-0613-3.
A complete guide, including stories, preparation, programs, booklists, activities, visuals.

McDonald, Margaret Read. The Storyteller's Start-Up Book. Little Rock: August House, Inc., 1993. ISBN 0-87483-305-1.
A good starting book, annotated resources for each chapter, and twelve tellable stories.

Mallan, Kerry. Children as Storytellers. Portsmouth, New Hampshire: Heinemann, 1991. ISBN 0-435-08779-7.
First published by the Primary English Teaching Association in Australia (PETA), it explores the place of storytelling in the classroom and gives practical suggestions and activities.

Eyeopeners! Beverly Kobrin, author. New York: The Trumpet Club, 1989. ISBN 0-440-84178-X
"How to choose and use children's books about real people, places, and things." New edition should be available.

The Kobrin Letter, Beverly Kobrin, publisher. $12/year (7).
732 Greer Road
Palo Alto, CA 94303

Nature's Course, Lynn Cherry, editor and director of CCEL (Center for Children's Environmental Literature). $12/year (4)
CCEL
P.O. Box 5995
Washington, DC 20016

Outstanding Science Trade Books for Children in 1994. A project of the NSTA-CBC Joint Committee. Send stamped (3 oz.) self-addressed, 6x9 envelope.
CBC
568 Broadway, Suite 404
New York, NY 10012

A to Zoo: Subject Access to Children's Picture Books. Carolyn W. Lima and John Lima, compilers. New York: Bowker, 1993 (updated periodically).
Valuable bibliography, references, and index!

Professional Organizations

Environmental Education Council of Ohio
397 West Myrtle Avenue
Newark, OH 43055

The Institute for Earth Education
P.O. Box 288
Warrenville, IL 60555

North American Association for Environmental Education

1255 23rd St. NW, Suite 400
Washington, DC 20037
(202) 884-8912
Fax: (202) 884-8701
(Headquarters)

P.O. Box 400
Troy, OH 45373
(513) 676-2514
Fax: (513) 676-2514
(Publications and Member Services)

Funding Sources

National Gardening Association
Youth Garden Grants Program
180 Flynn Avenue
Burlington, VT 05401

Ohio Environmental Education Fund
Ohio EPA
P.O. Box 1049
Columbus, OH 43216-1049

Phillips Petroleum Company
Phillips Environmental Partnerships (PEP Program)
16 D1 PB
Bartlesville, OH 74004

U.S. Environmental Protection Agency
Environmental Education Grants (A-107)
401 M Main Street SW
Washington, DC 20460

Catalogues and Other Sources of Environmental Education Materials

Common Ground Distributors, Inc.
370 Airport Road
Arden, NC 28704
(704) 684-5575
Fax: (704) 684-5779

Acorn Naturalists
17300 East 17th Street, Suite J-236
Tustin, CA 92680
(714) 838-4888

Demco, Inc. (Hinged Boxes for Activity Kits)
Box 7488
Madison, WI 53707
1-800-356-1200

ERIC Clearinghouse for Science, Mathematics, and Environmental Education
1929 Kenny Road
Columbus, OH 43210-1080
800-276-0462

APPENDIX

APPENDIX A

Natural Beginnings Workshop Leaders
Bowling Green State University
Bowling Green, Ohio
Summer, 1995

Dona Greene-Bolton
Paul Jones Child Development Center
Rhodes Road
Kent State University
Kent, OH 44242
216/672-2559

Carolyn Christ
Toledo Zoo
2700 Broadway
Toledo, OH 43609
419/385-5721

Joyce Davis
4025 Laskey
Toledo, OH 43623
419/475 -5367

Denise Gehring
5100 W. Central Avenue
Metroparks of the Toledo Area
Toledo, OH 43615
419/535-3058

Vicki Knauerhase
15367 Bowling Green Rd.
Bowling Green, OH 43402
419/372-7834

Rolinda LeMay
Lourdes College, MAH 120
6832 Convent Blvd.
Sylvania, OH 43560
419/885-3211

Steven McKee
1594 Kings Corners Rd., Rt. 7
Lexington, OH 44904
419/884-3764

Pamela Mowbray
Johnny Appleseed Metro Parks
2355 Ada Rd.
Lima, OH 45801
419/221-1232

Linda Penn
Lourdes College, MAH 120
6832 Convent Blvd.
Sylvania, OH 43560
419/885-3211

Judy Vandenbroek
Department of Special Education
Bowling Green State University
Bowling Green, OH 43403
419/372-7284

Marilyn Weiler
5725 Co. Rd. 171
Mt. Gilead, OH 43338
419/768-2579

Ruth Wilson
Department of Special Education
Bowling Green State University
Bowling Green, OH 43403
419/372-7278

APPENDIX B

Grant Proposal

Grant Proposal

NATURAL BEGINNINGS

Executive Summary

The primary purpose of this project is to provide inservice training for preschool teachers to assist them in providing quality environmental education (EE) at the early childhood level. The project will also promote the establishment of partnerships between early childhood educators and community environmental education professionals.

Inservice training will consist of a four-day summer workshop with a one-day follow-up session in the Fall. The workshop will be provided without cost to the participants and will be designed to accommodate 40 early childhood educators. Specific criteria and guidelines for participating will be developed. Specific objectives of the workshop will include the following: (a) to foster teachers' appreciation of nature, (b) to foster teachers' understanding of the natural environment, (c) to introduce teachers to EE materials and environmental education professionals in the community, (d) to foster partnerships between early childhood educators and EE resource professionals, (d) to increase teachers' knowledge, skill, and motivation for instilling understanding and appreciation of nature in young children, and (e) to develop confidence in and commitment to teaching EE at the early childhood level.

Participating Organizations

Organizations invited to participate in the proposed project will include: The Toledo Zoo, The Toledo Metro-Parks, the Wood County Park District, and The Toledo Area Association for the Education of Young Children. The Toledo Zoo, The Toledo Metro-Parks, and the Wood County Park District will be invited to participate in the planning and implementation of the inservice. They will be encouraged to share their resources with the participants and to discuss the establishment of an on-going relationship with the various early childhood programs represented. The Toledo Area Association for the Education of Young Children will be asked to assist in the recruitment of teachers for the inservice.

The first level of collaboration will be at the university level, between the College of Education and Allied Professions and the Center for Environmental Programs. Dr. Ruth Wilson, who will serve as project director, is an Assistant Professor with the College of Education. Her area of expertise is early childhood special education, and her activities over the past two years have included the coordination of two early childhood environmental education projects . Collaborating with Dr. Wilson will be Justine Magsig, assistant director of the Center for Environmental

Programs. Justine has been working with the Center for Environmental Programs since 1981 and, in this capacity, has been involved in developing courses in environmental studies and providing inservice workshops for teachers at the elementary level. She also teaches ENVS101, Approaches to Environmental Studies, a core course for students in education. A graduate student, assigned to the Center for Environmental Programs, will also assist in the implementation of the project.

Serving in an advisory capacity to the project will be an interdisciplinary team of professionals representing the College of Education at BGSU, EE resource professionals from the community, and several early childhood educators. This team will provide input in the planning and implementation of the Teacher Training Workshop and work with the Center for Environmental Programs to expand its resource library and other services to early childhood educators.

Issues and Context

Underlying causes of the present environmental crisis are directly linked to behavior patterns and value systems of individuals who consume and misuse natural resources. The restoration and future protection of the environment depend on the development of an environmental ethic. Schools can play a major role in the development of such an ethic. There are some major barriers, however, to the incorporation of environmental education into the school curriculum. These barriers include lack of teacher training and inadequate resource materials (Stone, 1989). The scarcity of resource materials is especially acute at the early childhood level (Wilson, 1991).

Environmental education at all levels of education, but especially at the preschool level, is proposed as a powerful preventive force for preserving the natural environment. Changing the attitudes and behaviors of people toward the natural environment has been identified in the professional literature as one of the greatest challenges facing education of the 1990s (Baker, 1983; Shane, 1989; Willis, 1989).

Attitudes toward the natural environment influence the way we think, feel, and act toward the environment. Research strongly suggests that positive experiences related to the out-of-doors during a child's preschool years have the potential for influencing life-long attitudes and behaviors toward the natural environment (Carson, 1984; Iozzi, 1989; Tokar, 1987). Also supported by the literature is the understanding that if environmental education is to be optimally effective, it must start at the early childhood level (Carson, 1984; Iozzi,1989, Wilson, 1993).

The focus of the proposed project is on prevention in terms of preserving the natural environment. This focus matches well the goals and objectives of the Ohio Environmental Education Fund, in that the project will enhance public awareness of issues affecting environmental quality.

The target group for this project will be early childhood educators, who are in a position to affect life-long attitudes and behaviors. The proposed project is designed to address this concern by providing an intense four-day workshop with follow-up assistance and support.

The proposed project is also designed to establish and/or strengthen linkages between early childhood educators and existing EE resources in the community, including the early childhood EE resource library at BGSU.

Goal and Objectives

The primary goal of the proposed project is to increase preschool teachers' expertise and confidence in providing EE at the early childhood level. The overall purpose will be promoted primarily through an intense teacher training workshop with follow-up assistance and support. Further efforts to increase preschool teachers' expertise and confidence in EE will include (a) the acquisition and dissemination of new materials for the early childhood EE resource library at BGSU, (b) presentations and an "EE Resource Fair" at the BGSU annual early childhood conference, and (c) the development and dissemination of a Teacher Training Handbook.

Included in the educator workshop will be strategies outlined in a newly-developed curriculum guide designed to infuse environmental education into all aspects of an early childhood program. This curriculum guide, Fostering a Sense of Wonder Early in Life, was developed and field tested by Dr. Ruth Wilson, who will be serving as the director of the proposed project.

An early childhood EE Resoure Fair will also be a part of the Summer Insitute. Through this Resource Fair teachers will be introduced to materials and community resources available for implementing an early childhood EE program. At the close of the summer institute, each participant will be given the opportunity to place a $50.00 order for resource materials to aid them in developing environmental activities that would enhance their teaching. These materials will become the property of the participants, so as to assit them in building a personal resource library for EE activities. The materials stipend will have the added benefit of causing the participants to carefully review the many resource materials available, so they could make the best choices. These materials will be given to the participants at the follow-up session in the Fall.

The participants will also be given a $150 materials allowance which is to be used toward the development of an "activity box" or "book bag." (Teachers will be given their choice as to which of the two they would like to develop.) In developing the "activity boxes" teachers will be asked to pull together materials for teaching a specific EE concept (e.g., seasons, trees, seeds, pond life, etc.). Criteria will be developed for what the activity boxes must include (e.g. a guide sheet outlining topic, objectives, and suggestions for implementation; hands-on materials, possibly including

animal puppets, magnifying glasses, etc.). The "book bags" will include a children's book with positive environmental themes, a guidesheet for activities relating to the story, and materials needed to implement the suggested activities. Participants will be required to field test the "activity box" or "book bag" and to share their projects with the larger group during the scheduled follow-up session in the Fall. The "activity boxes" and "book bags" will then become the property of the school or program in which the participant works. Selected "activity boxes" and "book bags" will be duplicated and added to the Resource Library at BGSU and also displayed at BGSU's annual early childhood conference.

The educator workshops will be directed toward teachers working in a variety of early childhood programs, including Head Start, day care centers, and public school preschool and kindergarten/primay programs. The workshops will use a "hands-on" process approach to learning and will emphasize a problem-solving and investigative approach to learning. The process and content of the educator workshop will then be shared with a wider audience by developing and disseminating a training manual.

As part of the partnering program, teams of teachers and environmental professionals will be encouraged to cooperatively develop partnership action plans. The action plans will describe the goals and corresponding activities that the partnership will undertake in the upcoming shcool year. Participants will be asked to share their proposed partnership activities with the larger group at the follow-up session. As the school year progresses, the teams will implement and assess the partnering activities.

A number of planning and design elements incorporated into the project will increase its potential for success. The framework for the content and methodlolgy is based upon previous successful professional development programs conducted by the sponsor. The project not only balances theory and practice, but models a strategy for effective staff development (Joyce & Showers, 1988). The theory, content and skills will be presented and modeled; participants will actively practice the topic and receive feedback; and the learning will be applied directly during the school year with support and guidance.

From the beginning of the project, teachers and resource professionals will be incorporated into the planning and development of the program objectives and activities. During the insitute, collaboration and peer interaction will be emphasized by modleing and by providing time for it to occur.

As part of the program evaluation, questionnaires will be administered before and after the summer institute to determine the impact that the course has on participants' knowledge of and confidence in teaching EE at the early childhood level. Additionally, a final survey will

be conducted in May, 1996 focusing on the teachers' perceived success in implementing an early childhood EE program and the extent to which they were involved in any partnership activities with EE resourse professionals.

Activities and Timeline

Establish steering committee	Summer, 1994
Locate materials for Resource Library	Summer, 1994 - Summer, 1996
Plan teacher training workshop	Fall, 1994 - Spring, 1995
Recruit teachers & EE resource professionals for workshop	Spring, 1995
Implement training workshop	Summer, 1995
Teachers develop "activity boxes" and "book bags"	Summer - Fall, 1995
Implement follow-up activities	Fall, 1995
Present awareness sessions and Resource Fair	Fall, 1995
Develop Teacher Training Handbook	Fall, 1995 - Spring, 1996
Disseminate Training Handbook	Spring, 1996

Results

An anticipated long-term result of this project is the development of attitudes and behaviors which reflect a sense of stewardship for the natural environment. Early childhood educators will become more aware of how they might foster such a sense of caring in young children. A Teacher Training Workshop will be provided to help teachers in this process. A Teacher Training Handbook will then be developed to facilitate the replication of this training in other parts of Ohio and elsewhere. Anticipated results of the project also include (a) the establishment of a working relationship between early childhood educators and EE resource professionals in the community, and (b) an expansion and greater utilization of the materials available through the EE Resource Library at BGSU.

Products of the project will include (a) the Teacher Training Handbook, (b) 10 - 15 EE "Activity Boxes," and (c) 10 - 15 EE "Book Bags."

The success of the project will be determined, in part, through questionnaires administered before and after the teacher training workshop to determine the impact that the course has on participants' knowledge of and confidence in teaching EE at the early childhood level. Additionally, a final survey will be conducted in May, 1996 focusing on the teachers' perceived success in implementing an early childhood EE program and the extent to which they are involved in any partnership activities with EE resource professionals.

Dissemination

Dissemination efforts will focus on presentations at state and local professional conferences and a Resource Fair hosted in conjunction with the annual early childhood conference at BGSU. Additionally, a Teacher Training Handbook will be developed and disseminated to the early childhood departments at colleges and universities in Ohio offering a Pre-Kindergarten program, the Head Start state coordinator, and other interested individuals.

REFERENCES

Baker, C. (1983, January). Evaluation and accountability. Journal of Physical Education, Recreation, and Dance, p. 58-59.

Carson, R. (1984). A sense of wonder. New York: Harper & Row.

Iozzi, L.A. (1989). Environmental education and the affective domain. Journal of Environmental Education, 20 (4), 6-13.

Shane, H.G. (1989, September). Educated foresight for the 1990s. Educational Leadership, pp. 4-6.

Stone, J. (1989). Preparing teachers to become involved as environmental educators. Contemporary Education, 60 (3), 159-162.

Tokar, B. (1987). The green alternative. San Pedro: R. & E. Miles.

APPENDIX C

Bibliography of Books Relating to Trees

Aliki. (1963). The story of Johnny Appleseed. New Jersey: Prentice-Hall.

Ayres, P. (1988). When dad cuts down the chestnut tree. New York: Alfred A. Knopf.

Baker, J. (1987). Where the forest meets the sea. New York: Greenwillow Books.

Burnie, D. (1988). Trees -- eyewitness book. New York: Alfred A. Knopf.

Buscaglia, L. (1982). The fall of Freddie the leaf. New Jersey: Charles B. Slack.

Cherry, L. (1990). The great kapok tree. New York: Harcourt Brace Javanovich.

Coats, L. J. (1987). The oak tree. New York: Macmillan.

Curran, E. (1985). Look at a tree. New Jersey: Troll Associates.

Ehlert, L. (1991). Red leaf, yellow leaf. New York: Scholastic.

Fisher, A. (1977). A tree with a thousand uses. Los Angeles: Bowmar.

Flowers and trees: A child's first library of learning. (1989). Alexandria, VA: Time Life Books.

Gackenbach, D. (1992). Mighty tree. San Diego: Harcourt Brace Javanovich.

Garelick, G., & Brenner, B. (1979). The tremendous tree book. New York: Four Winds Press.

Gibbons, G. (1984). The seasons of Arnold's apple tree. New York: Harcourt Brace Javanovich.

Hiscock, B. (1991). The big tree. New York: Macmillan.

Kalman, B., & Schaub, J. (1992). How trees help me. Ontario: Crabtree.

Kellogg, S. (1988). Johnny Appleseed. New York: Scholastic.

Killion, B. (1989). The apartment house tree. New York: Harper & Row.

Kirkpatrick, R. (1985). Leaves. Milwaukee: Raintree Children's Books.

Lyon, G. E. (1989). ABCedar -- an alphabet of trees. New York: Orchard Books.

Mitgutsch, A. (1981). From seed to pear. Minneapolis: Carolrhoda Books.

Newton, J. R. (1980). Forest log. New York: Thomas Y. Cromwell.

Parnall, P. 1987). Apple tree. New York: Macmillan.

Pike, N. (1983). The peach tree. Maryland: Stemmer House.

The rainforest -- a first discovery book. (1992). New York: Scholastic.

Romanova, N. (1983). Once there was a tree. New York: Dial Books.

Rose, D. L. (adapted). (1990). The people who hugged the trees. United States: Robert Rinehart.

Schreiber, A. (1994). Log hotel. New York: Scholastic. (Big Book)

Silverstein, S. (1964). The giving tree. United States: Harper & Row.

Soya, K. (1987). A house of leaves. New York: Philomel Books.

Testa, F. (1983). Leaves. New York: Peter Bedrick Books.

Trees - a first discovery book. (1992). New York: Scholastic.

Tresselt, A. (1972). The dead tree. New York: Harper & Row.

Wyler, R. (1990). The wonderful woods. New Jersey: J. Messner.

APPENDIX D

Project Learning Tree
Bibliography
Judy VandenBroek
Bowling Green State University

Behn, Harry. (1949). Trees. New York, NY: Henry Holt and Company, Inc.

Bunting, Eve. (1991). Night tree. Singapore. Harcourt Brace and Company.

Cherry, Lynne. (1990). The great kapok tree. San Diego, CA: Harcourt Brace and Company.

Dorling Kindersley Book. (1995). The ultimate trees and flowers sticker book. New York, NY: Dorling Kindersley Publishing.

Eastman, P. D. (1968). The best nest. New York, NY: Random House, Inc.

Forestry Suppliers, Inc. 1995 Education Catalog. Phone for catalog: 800-360-7788.

Grummer, Arnold. (1992). Tin can papermaking. Appleton, WI: Greg Markim, Inc.

Harlow, Rosie & Morgan, Gareth. (1991). 175 Amazing nature experiments. New York, NY: Random House.

Hass, Glenn. (1991). Creation speaks. Nashville, TN: Winston-Derek Publishers, Inc.

Jeffers, Susan. (1991). Brother Eagle, Sister Sky. New York, NY: Scholastic, Inc.

Kalman, Bobbie & Schaub, Janine. (1992). How trees help me. New York, NY: Crabtree Publishing Company.

Kalman, Bobbie & Schaub, Janine. (1992). I am a part of nature. New York, NY: Crabtree Publishing Company.

Kingfisher Books. Rescue mission planet earth by Children of the World. 1994.

Lauber, Patricia. (1994). Be a friend to trees. New York, NY: Harper Collins Publishers.

National Geographic Society. (1975). A day in the woods.

Oppenheim, Joanne & Reid, Barbara. (1968). Have you seen birds? Ontario, Canada: Scholastic - TAB Publications.

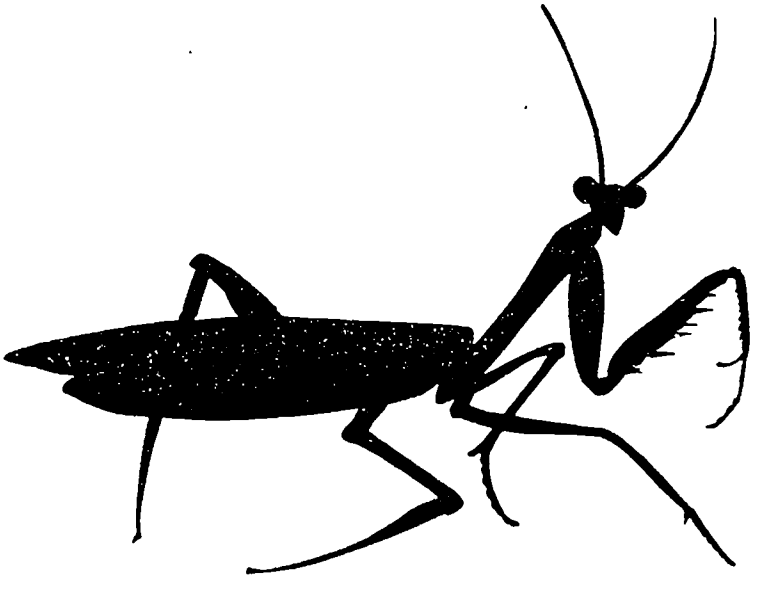
Oppenheim, Joanne. (1995). Have you seen trees? New York, NY: Scholastic, Inc.

Penn, Audrey. (1993). The kissing hand. Washington, DC: Child Welfare League of America.

Romanova, Natalia. (1983). Once there was a tree. New York, NY: Dial Books.

Scholastic Books. (1992). The rain forest. New York, NY: Scholastic, Inc.

Suess, Dr. (1971). The Lorax. New York, NY: Random House.



APPENDIX E

Proposal to Help Fund an Environmental Education Workshop

Project Description

This grant will be used to help fund an environmental education workshop for early childhood educations to be offered by (agency) on (date). Current funding for this workshop (supported by the Ohio Environmental Education Fund) provides for presenters and basic workshop materials but does not provide for lunches or other refreshments for the participants. Applicant would like to make lunches and other refreshments an integral part of the workshop, using them to demonstrate key environmental concepts.

There will be 25 workshop participants--all early childhood educators, representing such programs as Head Start, public schools, and community day care centers. The workshop will consist of four days of presentations and activities, all focusing on environmental education at the early childhood level. To enhance the workshop, the applicant is currently seeking funding to provide "environmentally-friendly" lunches and other refreshments for the participants. The rationale for this request is as follows:

1. To provide participants with information about the environmental impact of our personal eating choices (based on dietary choices, packaging, serving methods, and recycling efforts)
2. To demonstrate to participants how they might use snack and meal time in their programs to foster an understanding and appreciation of the natural environment
3. To help participants benefit from the workshop by attending to their personal comfort and enjoyment
4. To demonstrate respect for and appreciation of the contribution early childhood educators make to the community
5. To facilitate participant interaction and sharing during the lunch and break periods

Budget

1. 30 lunches (25 participants + 5 presenters, facilitators, and guests) x $4.00/lunch x 4 days = $480
2. additional refreshments at about $5.00 per day = $20

TOTAL = $500

Anticipated Outcomes/Benefits

The proposed project will promote the social welfare of the residents of the community by helping teachers become more aware of how to infuse environmental education into their programs and, thus, help students and their families become more aware of and interested in the natural environment.

APPENDIX F

Storytelling for All Ages
Marilyn Weiler

Select

1. Choose a story that has meaning or value to you.

2. Read the story aloud a couple of times. You may want to look for other versions and some background information about it.

3. In the beginning, choose short stories with uncomplicated plots and without many chants or passages which need to be memorized. Folktales, fairy tales, fables, and personal stories work well.

4. As you read, copy or list stories that interest you and put these in a folder for later use. This story bank will save you hours of time.

Prepare

1. Identify the chants, repetitive phrases, songs, and particular passages that need to be memorized.

2. Read the story over several times and note its structure.

3. Do whatever helps you to remember the story. Some ways that are used by others are: Visualize the scenes, outline or make sequence notes, tape record and play back, map out the story, make a flow chart.

4. Keep saying the story as you shower, walk, and drive.

5. Practice in front of a full-length mirror with gestures that you plan to use. You may want to tape this telling or have someone else listen to you to check your volume and rate of delivery.

6. Review what you know about your audience and plan your opening and closing sentences.

7. Do a quick run through just before your performane to set your mood and warm up your voice.

Communicate

1. Get your audience ready for the story by relating it to something current with them, by giving a little background, or with an old storyteller's opening. Make a bridge to the story's magical world.

2. Pause and collect your own thoughts and then just tell your story to each person in your audience.

3. Enjoy the story and your audience. Watch for reactions.

4. Bring the listeners back to the present world with an appropriate closing sentence.

APPENDIX G

Life Lab Curriculum
(Selected Sections)

Living Fossils
Life Untouched by Time

Written by
Rolinda Le May, Curriculum Consultant/Illustrator
Edited by
Linda Penn, Program Coordinator

Illustrated by
Rolinda Le May, Curriculum Consultant/Illustrator

Petals and Wings Life Lab
A
Nature Center
Lourdes College Sylvania, Ohio

Care and Keeping of Millipedes

Teacher Resource Page:

List of Materials Needed for Millipede Care:

- -millipedes - native "North American", or a tropical variety (biology supply house)
- -home - rectangular plastic animal habitat (try a local pet store)
- -bedding - peat moss, hardwood chips, or leaf litter
- -food - grapes, apples, bananas, sweet peppers (green or red), lettuce, etc..

Millipede Home:

- -make sure animal habitat is clean, rinse first with warm water, dry
- -add bedding that has been premoistened with water (should be damp, not wet)
- -introduce millipedes to their new habitat
- -add cut up food pieces to top of bedding material, millipedes do not mind food that sits in their container, however if mold grows remove it

Millipede Care:

- -lightly mist inside millipede cage each day, check that soil is neither soaked nor dry but just damp.
- -feed a small portion of food, remove any that is getting moldy, millipedes will easily go on an every-other-day feeding schedule, and may be left over the weekend if they have warmth and are adequately misted.

Reproduction/Growth:

- -millipedes reproduce by egg, they lay the eggs in small balls of decomposed material that may be mistaken for a dropping
- -millipede young look just like the adult, these animals undergo "incomplete metamorphosis" (like people, as opposed to a butterfly which undergoes "complete metamorphosis")
- -millipede young start out with few segments (usually 3), and increase in size with each molting

Millipede Anatomy:

- -millipedes have segmented bodies with two pairs of legs per segment
- -millipedes have two simple eyes with poor sight
- -millipedes have two complex jointed antennae that sense the environment
- -millipedes have chewing mouth parts similar to caterpillars' mouth parts
- -millipedes have jointed legs that are bristle brush like to help them grip
- -millipedes have one opening for waste at their tail end

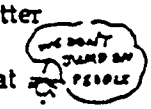
Defense:

- -millipedes have "stink glands" to ward off predators, however tropical millipedes produce no noticeable smell and "stinking" rarely occurs as they adjust to being handled quickly
- -millipedes exhibit a common defense posture-they coil up, until the perceived threat passes

"Explorations"
Living Fossils on Land Investigations
Investigation #1 - "An insect or not an insect, That IS the question!"
An Observation Activity

Major Concepts:
-a millipede is an animal.
-a millipede is an arthropod.
-millipede body structure (morphology) is suited for it's niche in life
-millipedes are not harmful and serve as nature's recyclers

Scientific Objectives:
Scientific Knowledge:
learners will:
-understand that although a millipede is an arthropod, it is not an insect
-recognize that millipedes reproduce by laying eggs and undergo "incomplete metamorphosis", like grasshoppers and humans
-gain knowledge that millipedes function as decomposers of forest floor litter and are are nocturnal vegetarians
-understand millipedes have a symbiotic relationship with the mites that live on them, this symbiotic relationship benefits both and is therefore a "mutualistic" symbiosis (benefiting both partners in the relationship)
-recognize that millipedes have special defenses against predators



Scientific Inquiry/Process Skills:
learners will:
-demonstrate experience with the scientific method in experiments involving millipedes
-create a representation of a millipede with all body parts
-demonstrate safe handling of millipedes
-interpret/create a simple bar graph showing millipede data

Applications for Science Learning:
learners will:
-apply curiosity about millipedes and other leaf litter organisms to potential independent study projects
-apply study techniques used to study millipedes to other organisms, such as mealworms, worms, caterpillars...

Teaching Strategies:
Conditions for Science Learning:
learners will:
-work in a cooperative setting
-participate in teacher facilitated, inquiry based activities

Interdisciplinary Subjects:
-science, art, mathematics

Time Estimate: 30-40 minutes

Safety and Disposal:

As with any animal exploration insist on gentle handling of the animals. Dispose of wastes in the trash can. Have all students wash after handling animals.

Advanced Preparations: Have all materials listed below out and accessible to groups.

You will need per group:

-millipedes (at least one per group)
-trays such as disposable jelly roll pans
-food such as apple slices
-drawing of millipede with other insects
-scale and rulers

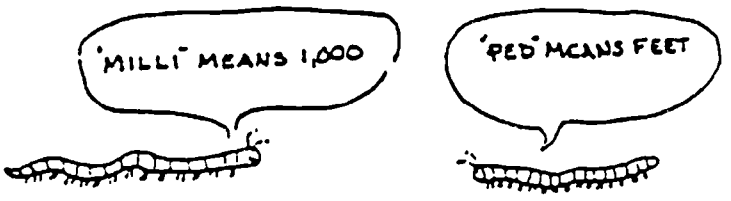
Engagement:

"Today we are going to meet one of the world's first land dwellers. This type of little creature is more prehistoric than the dinosaurs, yet it did not become extinct. It still flourishes on the earth today. It is a gentle animal that cannot hurt you in any way. You could hurt it though, so remember how large you are in relation to how small it is, and treat it with kindness." (Divide class into small groups.)

Exploration:

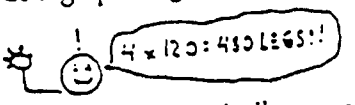
Give each cooperative group a millipede on a tray with an apple slice. Encourage exploration of the millipede. Ask leading questions (i.e. Is a millipede an insect?). Why? How does the millipede move? How many body parts can you see and recognize? What does "milli" mean? What does "ped" mean? Does it have that many legs? How many are on each segment?) Have each group sketch a representation of the millipede and label body parts they recognize. Offer the apple. Watch the millipede eat. How does its mouth move when it eats?

Have you seen any other animal eat in the same manner? [Some children may have, as caterpillars eat in much the same way!] Have someone from the group allow the millipede to walk on their hand. How did it feel? Provide a scale and ruler. How much did the millipede weigh? How long is it? This data could be plotted on a scatter graph showing the class results. Did the millipede curl up when you first tried to touch it? Why do you think it behaved this way?



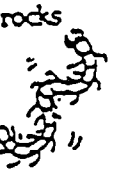
Explanation:

Use this opportunity to allow student groups to relay what they have found through their explorations and record their groups data (length, weight) on a class graph. Discuss why millipedes do not need good eyesight (they forage on the dark forest floor using their antennae to sense their path). Ask if anyone can tell the function of the millipedes antennae (to sense the environment). Tropical millipedes have four legs per segment, and the average adult is 120 segments long!

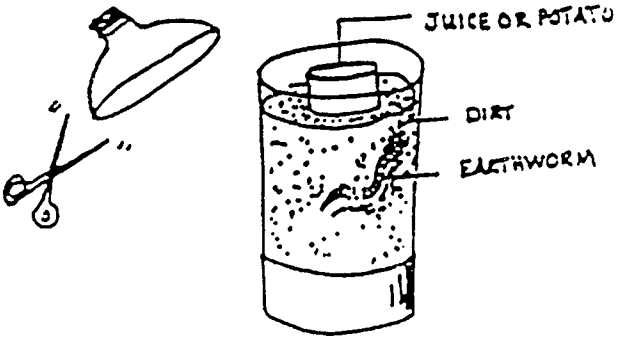


Extension:

One extension would be to explore similar organisms and discover likenesses and differences. Segmented animals to explore could include centipedes, worms, and caterpillars. Look for differences and similarities in structure, diet and behavior. Handle centipedes with care and keep in a clear plastic container. They are not nice classroom animals to have roaming freely about. Centipedes can be found under rocks and logs. One long legged variety seems to have a preference for household basements. A major difference between centipedes and millipedes is that millipedes have chewing mouth parts and centipedes have predacious pincers (centipede pincers are "predatory"-for preying on other insects). Centipedes also have only two legs per body segment, and move in a wriggling "S" shape.



Worms can be kept in a vermarium (ver-MARE-ee-um) made from a pop bottle (a vermarium is a worm farm). Cut off the top end of a two liter bottle. Place a tall slender can (such as a frozen juice can) in the middle and surround it with dirt. This forms a narrow space so the worms tunnels will be close to the walls of the bottle. Make a black construction paper sleeve to fit over the container when not being observed (worms like darkness). Feed worms bits of vegetation and keep soil moist. The top of the container can be left open, or you can pry off the bottom of a second two liter bottle and use it as a lid. Worms are segmented like millipedes but they lack an exoskeleton having instead a soft and slimy body. Worms have no legs. They move through the soil by digging in with their "cetae" (SEE-tay), bristle-like hairs present on each body segment. Worms lack the grinding mouth parts of a millipede or caterpillar.



Extensions Cont:

Caterpillars are also segmented. Caterpillars can be obtained from a variety of sources. If the season is appropriate for caterpillars they can be collected in the wild. They can be ordered from biological or entomological sources as well. Caterpillars are segmented like millipedes. The caterpillar does not have legs on each segment. Caterpillars only have six "true" legs, (a characteristic of being an insect larvae) the other ten are false legs that are lost in the metamorphosis from caterpillar to butterfly. Caterpillars and millipedes have similar mouth parts. They both chew with mouth parts moving side to side.

Evaluation:

Have students review by making a "millipede rap". Have them sketch a millipede labeling all the parts they saw and what they were for.

Curriculum Integration Ideas:

Environmental Education: Millipedes are great recyclers. They munch leaves on the forest floor and turn them back into usable soil. Why is recycling good? List some natural recyclers and why they are important to their ecosystem (i.e. earthworms...).

"Explorations"
Living Fossils on Land Investigations
Investigation #2 - Marvelous Millipedes
Darkness or light, which do they prefer?

Major Concepts:
-a millipede is an animal.
-a millipede is an arthropod.
-millipede body structure (morphology) is suited for it's niche in life
-millipedes are not harmful, they serve as nature's recyclers

Scientific Objectives:
Scientific Knowledge:
learners will:
-understand that although a millipede is an arthropod, it is not an insect
-recognize that millipedes reproduce by laying eggs and undergo incomplete metamorphosis
-gain knowledge that millipedes function as decomposers of forest floor litter and are are nocturnal vegetarians
-understand millipedes have a symbiotic relationship with the mites that live on them
-recognize that millipedes have special defenses against predators

Scientific Inquiry/Process Skills:
learners will:
-demonstrate experience with the scientific method during explorations with live millipedes (observation and questioning, hypothesis, testing, etc....)
-create a representation of a millipede with all body parts
-demonstrate safe handling of millipedes
-interpret/create a simple bar graph showing millipede data

Applications For Science Learning:
learners will:
-apply curiosity about millipedes and other leaf litter organisms to potential independent study projects
-apply study techniques used to study millipedes to other organisms, such as mealworms

Teaching Strategies:
Conditions for Science Learning:
learners will:
-work in a cooperative setting
-participate in teacher facilitated, inquiry based activities

Interdisciplinary Subjects:
-science, art, mathematic

Time Estimate: 40-45 minutes

You will need per group:

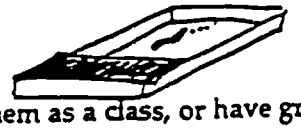
-small tubs (dish washing tubs, or similar shaped containers, one per group
-one millipede (at minimum) per group
-sheets of dark paper or similar cover material to darken one end of tub

Engagement:

Learners will be invited to meet the classroom millipedes. Ample space for small group learning should be provided, desks together, tables, or sitting in circles on the floor. Tubs work well as observation containers, aluminum roaster pans (disposable) or plastic dish tubs are ideal. Millipedes and related materials should be displayed to arouse learner curiosity. Learners will be invited to hypothesize as to whether millipedes prefer darkness or light. These responses can be recorded by a group recorder or they can be tallied on the bulletin board as a whole class.

Exploration:

Each group should receive one tub and one millipede (or more). They should be instructed to take the available paper or other provided covering material and fashion a shade for one end of their tub. Allow time for millipedes to move about in their containters.



Elaboration/explanation:

Ask for student results again. Tally them as a class, or have groups tally their own results. Make a class graph depicting how many millipedes went toward the dark side versus the light side. Ask why the millipedes prefer darkness. (The results should show this. If it does not you may explain that science data is usually collected from many repetitions of an experiment. If time allows try again.) Some expected responses could include; "it helps the millipede hide" (from predators), "they like it"(it keeps them from dehydrating) etc.. Millipedes are nocturnal (night active) and forage for food under cover of night.

Extension:

One extension is to do this experiment with other small organisms such as pillbugs, earthworms, slugs, etc.. Most small leaf-litter dwelling organisms prefer darkness as it affords protection from predators and prevents dehydration from exposur to wind and sun.

Evaluation:

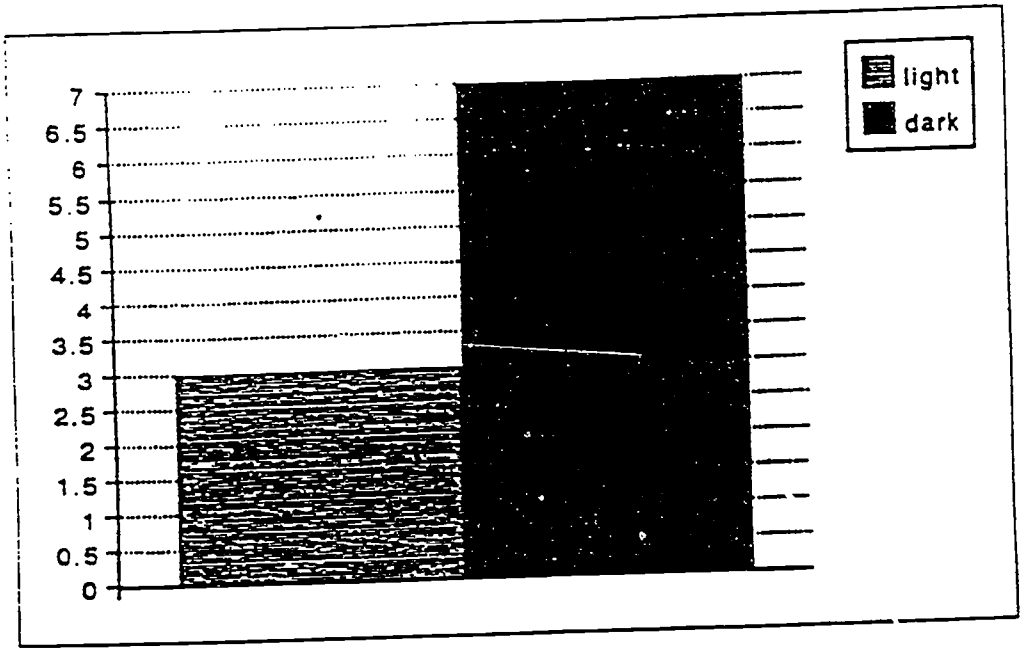
Learners could construct a simple bar graph to show their results. Total numbers could be counted up using tally marks.

Curriculum Integration Ideas:

Language Arts: Students could make up millipede poetry (they lend themselves to limericks). They could write metaphoric poetry or prose ("A millipede is a recycling station..."). They could write stories from a millipedes viewpoint of the world.

Math: Multiply, divide, add and subtract! Millipedes have four legs per segment so you could set up all kinds of problems: "Divide the number of legs on a 100 segment millipede by the number of legs on one that is 10 segments. What is your answer? How many legs would you find on a millipede with that many segments?"

Millipede Math:
Make a Bar Graph!



The above shows a simple bar graph. A bar graph is a visual representation of a numerical value. In the above example it is depicted that out of 10 millipedes sampled, 3 stayed in the light environment, and 7 preferred a dark environment.

This graph lends itself to whole class involvement. On the board (or a large sheet of paper) the teacher can sketch a divided "tower" with a block marked for each value. As students come up and color in either a "light" or a "dark" block they will begin to get a picture of how many millipedes preferred light, and how many preferred dark. With older students you could simply have students come up and make tally marks under "light or "dark". After all millipedes had been tallied you could have them convert the values indicated by the tally marks into a bar graph representation.

Care and Keeping of Pillbugs

Teacher Resource Page:

List of Materials Needed for Pillbug Care:

- -land isopods ("pillbugs") - local, or from a biology supply house
- -home - rectangular plastic animal habitat (try a local pet store)
- -bedding - a 1 to 2 inch layer of sand
- -food - lettuce, spinach, sweet peppers (green or red), or other vegetables

Pillbug Care Home:

- -make sure animal habitat is clean, rinse first with warm water, dry
- -add sand that has been premoistened with water (should be damp, not wet)
- -introduce pillbugs to their new habitat
- -add cut up food pieces to top of bedding material

Pillbug Care Care:

- -lightly mist inside of cage each day, check that soil is neither soaked nor dry but just damp.
- -feed a small portion of food, remove any that is getting shriveled
- -pillbugs adapt easily to an every-other-day feeding schedule, and may be left over the weekend if they have warmth and are adequately misted.

Reproduction/Growth:

- -pillbugs reproduce by egg, they carry the eggs in "brood sacks" beneath their abdomen
- -pillbug young look just like the adult, these animals undergo "incomplete metamorphosis" (like people, as opposed to a butterfly which undergoes "complete metamorphosis")
- -pillbugs shed their "exoskeleton" (outside body covering) each time they grow

Pillbug Care Anatomy:

- -pillbugs have two eyes on eyestalks
- -pillbugs have two antennae that sense the environment
- -pillbugs have seven pairs of leg
- -pillbug bodies have two parts, the thorax and abdomen

Defense:

- -most pillbugs roll up as a defense ("rollers") against dehydration or predators
- -a few species run ("hikers")
- -pillbugs must stay moist as they are crustaceans like crabs and lobsters and will die if allowed to dry out (they breathe through gill-like structures that are damaged if dehydrated)

"Explorations"

Living Fossils on Land Investigations

Investigation # 3 - Perplexing Pillbug Puzzles

Major Concepts:

-pillbugs are not bugs, nor are they insects
-pillbugs are crustaceans (crus-TAY-shuns) like crabs, lobster and crayfish
-pillbugs are isopods (I-so-pods)
-pillbugs reproduce by eggs
-pillbugs undergo incomplete metamorphosis (like grasshoppers, or people!)
-pillbugs eat forest floor debris (leaves, fungi...)
-pillbug defense falls into two types "hikers" and "rollers"

Scientific Objectives:

Scientific Knowledge:

learners will:

-know the pillbug life cycle
-know why a pillbug is not a "bug"
-understand the role of the pillbug is that of a "recycler", one that aides decomposition
-know that pillbugs are an ancient life form similar in appearance to trilobites
-understand that pillbugs require moisture as they are crustaceans

Scientific Inquiry/Process Skills:

-observe and draw a pillbug
-form a hypothesis as to what conditions pillbugs feel are optimum (i.e., light or dark, hot or cold, damp or dry etc..)
-design an experiment to measure pillbug response to test your hypothesis
-imitate the motion of "hiker" and "roller" (appropriate for younger grades) when threatened by danger

Applications for Science Learning:

-apply knowledge of an isopod's defense to other creatures
-apply knowledge of the isopod's long history of remaining unchanged to other life forms (i.e. ginko tree, opossum, millipede....all are "living fossils")

Teaching Strategies:

Conditions of Science Learning

learners will:

-work in small group/cooperative settings
-participate in teacher facilitated inquiry/discovery activities

Interdisciplinary Subjects:

-mathematics, science, art, language arts

Time Estimate: 30-40 minutes

You will need per group:

-live isopods
-small trays (square plastic frozen meal containers work well)
-hand lenses (magnifying glasses)
-toothpicks
-paper toweling
-water, or access to it
-pictures of trilobites .....

Note: Pillbugs ("sowbugs") may be ordered from any school biological/science supplier. In warm weather they may also be located under logs, stones, lawn ornaments and furniture and other places where a dark, moist habitat may be found out-of-doors.

Safety and Disposal:

Common pillbugs (also called sowbugs) may be released out-of-doors when no longer needed. Discard soil in a place where it will mix in with other earth. If you plan do this activity more than once a pillbug "farm" can be constructed from a square plastic animal habitat (like for small animals). Simply place a good layer of soil in the bottom, bark or other wood pieces beneath which to hide, and provide moisture (mist) daily. Give occasional scraps of leafy vegetables, fruits or other such materials. As with all animal explorations, make sure learners dispose of used paper toweling and wash their hands after exploring their pillbug.

Advanced Preparation:

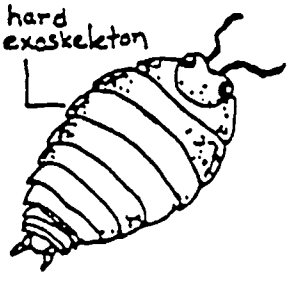
Prepare pillbug habitat as suggested in "Safety and Disposal" above. If using only for this exploration dispose of properly when through. Set out materials so groups have access to materials needed.

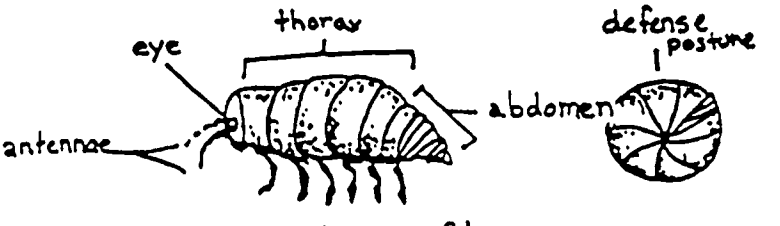
Engagement:

Start with a few thought provoking questions. Ask learners if they know of any dinosaurs still around. Why? Someone in the group will most likely answer that they all died. This is true. They became "extinct"(X-teenct). Over the many years of the Earth's development lots of living things have become extinct. But some things have survived for millions of years unchanged. Just the same as they were long ago. Invite groups to come up and take supplies and an isopod or two back to their work area.

Exploration:

Have all learners take a close look at the pillbug. Have they seen this animal before (many may have)? Do they know the name of the animal (expect "pillbug", "sowbug", "potato bug", "basketball bug" and probably more....)? Is this animal an insect (no)? [Draw on the board a typical insect "ant" shape with round head, box-like thorax (chest), and oval abdomen (behind) to this add six legs, three to each side of the thorax. Ask learners to use this "typical insect" to help them answer this question.] Why isn't this animal an insect (it has more than six legs)? Ask them to observe other features such as, eyes, antennae, and body construction. Have them observe to see the behavior of the pillbugs when threatened (gently prod with the toothpick). Some will lift their "tail-end" and run, most will roll into a ball.





Explanation:

The pillbug is not an insect, but it is an arthropod (ARTH-ro-pod). So are insects, millipedes, spiders, and other animals with jointed legs and bodies. The pillbug's properly called an "isopod"(I-so-pod), and it is a crustacean, like a crab, lobster, or shrimp. It lays eggs that the female holds under her "belly" (abdomen) in a special pouch. Have learners roll their pillbugs on their backs to see if there are any with eggs. How many legs did the students note (should be 14)? How many antennae (two). Do they think they have good or poor vision (poor)?

Pillbugs usually display one of two behaviors when threatened, they roll or they run. The ones that run can be called "hikers" and the ones that roll, "rollers". Ask learners if the pillbug they observed a "hiker" or a "roller".

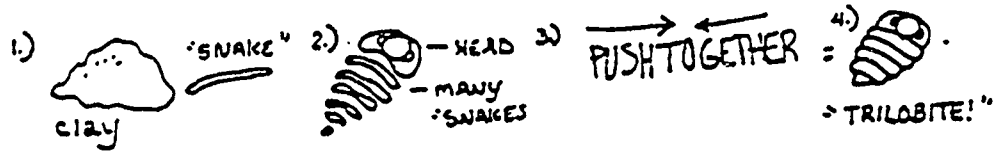
Explain that the pillbug looks like another ancient arthropod. It looks like a trilobite. Pass pictures of trilobites to each group. Have each group list ways in which trilobites and pillbugs are the same, or different. A two-circle "Venn" diagram can be used to list characteristics. Place pillbug characteristics in one circle, trilobite characteristics in the other circle, and common characteristics in the middle!

Extension:

Have learners set up pillbug "testing stations". Use the square observation containers lined with damp paper toweling to provide a test site (tape paper towel down first before dampening). Have them test preferences in pillbugs. Some things they could test for would be preference for light or dark, damp or dry, and for different kinds of food. Allow learners to come up with their own test and test techniques to solve questions they may have about pillbugs.

Curriculum Integration Ideas:

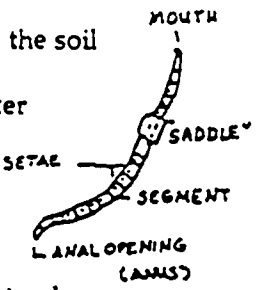
Art: Pillbugs and trilobites lend themselves to sculpture. Show learners how to connect small clay "snake" shapes to form the segmented body of a pillbug out of air drying clay. Have on hand pipe cleaners for legs and antennae.



"Explorations"
Living Fossils on Land Investigations
Investigation #4 - "Watching Wigglers"

Major Concept:

-an earthworm is an animal
-an earthworm belongs to the phylum "annelida"
-earthworms have both male and female parts
-earthworms lay eggs in worm "casts"
-earthworms digest organic (once living) matter from the soil
-earthworms enrich the soil with their droppings
-earthworm tunnels aerate the soil, bringing rain water and surface nutrients deeper into the soil



Science Objectives:

Scientific Knowledge:
learners will:

-understand that an earthworm is a living animal
-know basic earthworm anatomy
-know that earthworms are beneficial organisms and why

Scientific Inquiry/Process Skills:
learners will:

-explore earthworm behavior through hands-on experiences with earthworms under different conditions (alterations in light, moisture, etc...)
-examine earthworms closely to observe and record external body characteristics
-develop an earthworm habitat, or earthworm experiment showing the usefulness of earthworms (i.e. a worm composting farm)
-research the phylum annelida for interesting bits of "worm wisdom"

Applications for Science Learning:
learners will:

-apply knowledge of the beneficial nature of worms as to why we should encourage worms to inhabit residential lawns and gardens and crop fields and how to go about doing this
-apply knowledge of worms to composting and how worms can assist

Teaching Strategies:

Conditions for Science Learning:

-facilitated inquiry/discovery learning
-small/cooperative group learning situations most appropriate
-collaboration on group worm project

Interdisciplinary Subjects:

-science: biology, earth science

Time Estimate: 40 minutes

You will need:

-small trays (frozen microwave dinner trays work well)
-paper towels
-a plant mister
-a pint container of bait earthworms
-black construction paper
-magnifying glasses
-classroom "vermarium" (ver-MARE-ee-um), a worm habitat that is also called a "wormery"

Safety and Disposal:

Always remind learners to wash their hands after handling worms. Soil contains many microbes that are not to be ingested! For the health of the worms, remind learners to mist their paper toweling frequently so the worms do not dry out. Worms may be returned to the soil after classroom use.

Engagement:

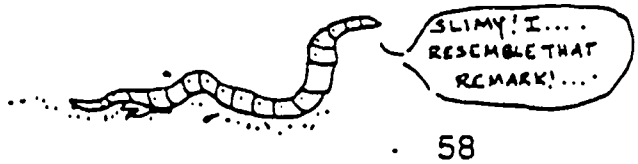
Did you ever walk along a sidewalk on a rainy afternoon? What kind of animal do you always see lying in the rain. Earthworms, that's right! The earthworms come up onto the grass and sidewalk because rain has flooded their underground tunnels. If the worm can stay on the grassand out of deep water, it can return to an underground life after the rain stops. The sun will come out and dry the ground and the earthworm can tunnel again. Today we are going to learn more about earthworms and their unusual diet and way of moving.

Exploration:

Have groups come up and get a tray. Line the tray with paper toweling and mist the toweling well (until quite damp). Place one earthworm on the tray. Obtain a piece of black construction paper. Take all items back to the group workspace. Observe the earthworm. Can you tell which end is the head end? How does the worm move? Place the earthworm on a piece of paper and listen closely and carefully. Do you hear a scratching sound? That sound comes from something on the worms body. Look at the worm with the magnifying glass to see if you can see what is making the noise you hear. Locate the worms "saddle", that is the bigger bump-like structure near one end of it's body. It contains the male and female worm parts.

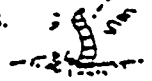
Explanation:

All life on the Earth is classified. That means it is divided up according to characteristics and like things are grouped together. Earthworms are animals. They are invertebrates, animals that lack a backbone. They belong to the group called the annelid worms. This group of worms has over 12,000 species. Each annelid worm has a mouth, a segmented body, and an anus. Many annelid worms have setae (SEE-tay), bristle-like hairs that help in moving. They give the worm traction as it pulls itself along underground. An ocean cousin to our earthworm would be the bristleworm. It has long hair-like setae (plural, singular is seta). Earthworms feed on organic matter, like decaying leaves. They take in soil and organic matter at the mouth end, and nutrient-rich worm "casts" come out the anal end. Earthworms have five simple hearts, and a simple digestive system. They produce a slimy coating to protect themselves from drying out and they "breathe" through their skin.



Extensions:

After a light rain see if learners can call worms to the surface by doing a "worm dance." Worms are sensitive to vibration. Have learners form a circle and dance in place for about five minutes. The vibration should drive some worms up to the surface. Discover if worms prefer dark or light. Cover one end of the worms tray with dark paper. Put the worm in the middle and see which way it goes.



Evaluation:

Have learners sketch their worm and label it's parts. Have them design an earthworm habitat, a worm composting project or other worm related project and report on it. Have them design a bulletin board of the underground world of the earthworm and research bits of information for a "Worm Wisdom" display. Be creative in coming up with ways to assess learners knowledge of worms!

Curriculum Integration Ideas:

Art: With young learners have teach them to roll clay to form wiggling "worms". Have children make a worm "crayon resist" painting. Color in tunnels and worms with crayon in lighter colors, paint over it in black or brown and watch the worm tunnels appear!

Language Arts: Read stories about worms. Better yet, do a classroom story. Give a starting line and let learners each add a line to the story. Take it one step further and have learners illustrate a page with their story line on it and bind them all together to make a classroom book about worms!

Earthworm Explorations

The earthworm looks like this:

It is _____ inches long, or _____ centimeters long!

Does it have a mouth? ____ yes, or ____ no

Does it have eyes? ____ yes, or ____ no

Does it have legs? ____ yes, or ____ no

How does the earthworm move? _____

_____

_____

Put the earthworm on a piece of firm paper (like construction paper). Put your ear down close to the worm and listen carefully. You should hear a scratchy noise. This is made by the worms "setae" (SEE-tay). Setae are stiff hairs on the worms body segments. They help to pull the worm along underground. Look with a magnifying glass at the sides of your worm to see the setae. Can you see them? _____

Do worms prefer light or dark places to live? Put the earthworm onto the tray. Cover up one end of the tray with the black construction paper (make a little "tent"). Leave the other end open. Where does the worm crawl? _____